United States Court of Appeals

for the Second Circuit

RESPONDENT'S BRIEF

NOS. 74-1830,1841,2246

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

AMSTAR CORPORATION,

SUCREST CORPORATION,

CALIFORNIA AND HAWAIIAN SUGAR COMPANY,

Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

ON PETITION FOR REVIEW

BRIEF FOR RESPONDENT

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INDEX

Page

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JURISDICTION

This Court has jurisdiction, pursuant to Section 509(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (henceforth "the Act" or "the FWPCA"), 33 U.S.C. sec. 1369(b)(1), to review the action of the Administrator of the Environmental Protection Agency (henceforth "the Agency" or "EPA") in promulgating regulations pursuant to Sections 301, 304(b), 306, and 307 of the Act, 33 U.S.C. secs. 1311, 1314(b), 1316, and 1317.

STATUTE INVOLVED

The relevant portions of the Federal Water Pollution Control Act Amendments of 1972, 86 Stat. 816, 33 U.S.C. sec. 1251 et seq., are reproduced as Appendix A to this brief.

ISSUES PRESENTED

1. Whether this Court should review certain technical issues raised by Amstar in its brief which were not presented to the Agency for its consideration during the rulemaking proceedings?

2. Whether the regulations issued by EPA under Sections 301(b)(1)(A) and 304(b) of the Act identifying and designating the "best practicable control technology currently available" and prescribing effluent limitations based thereon for crystalline cane sugar refineries are valid?

3. Whether the regulations issued by EPA under Sections 301(b)(2)(A) and 304(b) of the Act identifying and designating the "best available technology economically achievable" and prescribing effluent limitations based thereon for cane sugar refineries are valid?

STATEMENT

A. Statutory framework

In the Federal Water Pollution Control Act of 1972, 33 U.S.C. sec. 1251 et seq., [1/] Congress declared the national objective "to restore and maintain the chemical, physical and biological integrity of the Nation's waters." Section 101(a). Whereas previous Acts on this subject focused on water quality considerations alone, the FWPCA is based primarily on achieving effluent reductions by the installation of certain technologies of pollution control. Thus, existing sources of pollution are required

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1/ All citations to the Act will refer to the original section numbers rather than to those appearing in the United States Code. Correlations are provided in the Table of Authorities.

by Section 301(b)(1)(A) to meet, no later than July 1, 1977, effluent limitations based upon the best practicable control technology currently available (henceforth "BPT") as defined by the Administrator pursuant to Section 304(b) of this Act. And, by July 1, 1983, existing sources are required by Section 301(b)(2)(A) to meet effluent limitations based upon the best available technology economically achievable (henceforth "BAT") as determined in accordance with Section 304(b)(2). This 1983 standard is to be zero discharge of pollutants if this is found by the Administrator to be technologically and economically feasible. Sec. 301(b)(2)(A).

Both the 1977 and 1983 limitations required by Section 301 make reference to 304(b). This Section requires the Administrator to "identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of" BPT and BAT for classes and categories of point sources. Sec. 304(b)(1)(A) and (2)(A). Five of the six factors specified for determining these BPT and BAT guidelines are as follows: the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, and non-water quality environmental impact (including energy requirements). Sec. 304(b)(1)(B) and (2)(B). The sixth factor relating to costs is different for the two technology levels. For BPT it is the cost of the technology in relation to the effluent reduction benefits and for BAT, the cost of achieving such effluent reduction. Additionally, the Administrator may specify "such other factors" as he deems appropriate. Sec. 304(b)(1)(B) and (2)(B).

The Act also requires the establishment by the Administrator of new source performance standards under Section 306, based upon the best available demonstrated control technology. New source performance standards are not at issue in this case.

The effluent limitations and standards described above are in turn applied to specific plants through permits issued pursuant to the National Pollutant Discharge Elimination System ("NPDES") established in Section 402 of the Act.

B. Summary of proceedings to date

In July, 1973, the Agency issued for public review and comment its "Draft Development Document for Effluent Limitations and Guidelines and New Source Performance Standards for the Cane Sugar Processing Industry," prepared by Environmental Science and Engineering, Inc. of Gainesville, Florida (R. 1-198). The preparation and issuance of this document was in accordance with the Agency's general procedures for preparation and public review of proposed effluent limitations guidelines and new source performance standards pursuant to Sections 301, 304, and 306 of the Act. See Advance Notice of Public Review Procedures, published August 6, 1973, 38 F.R. 21202-21206 (R. 2478-2483).

This draft development document was followed by two supplements setting forth additional data and material gathered by the Agency in support of regulations to be proposed for the sugar processing category. Public comments were invited in response to the draft development document, and sixteen comments were received (R. 2289-2477).

Thereafter on December 7, 1973, following a careful review of these documents including the public comments, the Agency published in the Federal Register its notice of Proposed Effluent Limitations Guidelines and Standards of Performance and Pretreatment Standards for New Sources for the Cane Sugar Refining Segment of the Sugar Processing Point Source Category, 38 F.R. 33846 (R. 2738-2745). Eleven comments were received from the public in response to this proposal, and information was also received by the Agency from the Effluent Standards and Water Quality Information Advisory Committee (R. 3066-3099). A revised development document (R. 2593-2737) and an economic analysis (R. 2484-2592) were also issued at the time of the publication of the proposed standards.

Following consideration of the comments received, the Agency on March 20, 1974, promulgated final Effluent Limitations Guidelines, Standards of Performance and Pretreatment Standards for New Sources for the Liquid and Crystalline Cane Sugar Refining Subcategory, 39 F.R. 10522 (R. 3100-3107). The preamble portion of the Federal Register notice of promulgation of the regulations included a summary of the significant comments received during the rulemaking proceedings together with the Agency's response to those comments. The preamble also included a statement with respect to expected economic impact which the Agency concluded would not be significant, together with a limited cost-benefit analysis which included reference both to the 1973 economic analysis and the final development document which was issued a few months following the promulgated standards (R. 3108-3281). This was the third and final

draft of the development document, and it further reflected the public comments and information gathered by the Agency in support of the regulations at issue in these proceedings.

Following promulgation of the regulations, four companies filed petitions for review in three separate Courts of Appeal, as noted in the brief for petitioner California and Hawaiian Sugar Company (henceforth "C&H") at page 10. These petitions were consolidated in this Court on October 15, 1974, and thereafter one of the petitioners, National Sugar Refining Company, stipulated to a dismissal of its petition.

On November 12, 1975, this Court issued an order granting a motion of C&H for a stay of the application of the effluent limitations guidelines challenged by C&H in these proceedings to its Crockett, California, refinery until the date of oral argument in this case.

C. Process description

There are twenty-two crystalline cane sugar refineries in the United States and Puerto Rico (see R. 3127), eight of which operate in conjunction with cane sugar factories (see R. 3131). 2/ The crystalline refining process employed at these refineries removes essentially all impurities from raw cane sugar to produce a white crystalline sugar, sucrose, and a salable by-product, molasses (R. 3128).

2/ Two additional refineries employ both the crystalline and liquid refining process at the same facility. See R. 3127. Five refineries produce liquid sugar only. See R. 3127. Separate effluent limitations guidelines, which have not been challenged, have been issued for the liquid cane sugar refining subcategory at 40 CFR Sections 409.30-409.36.

The process itself consists of four basic steps: (1) crystalline raw sugar is washed to remove part of its molasses coating; (2) water is added to the washed crystals to form a solution called "melt"; (3) the sugar solution is clarified and decolorized to remove additional impurities; and (4) sugar is recrystallized, dried, and prepared for shipment (see R. 3135).

There are basically two types of process waste water discharged from a crystalline refinery -- process water and barometric condenser cooling water (bccw). Bccw is used to condense the water vapors which are boiled out of the sugar solution during the recrystallization step (R. 3168). In this process the bccw comes into physical contact with the water vapor. The sugar contained in the water vapor enters into (or becomes entrained in) the bccw discharge stream (R. 3169).

Process water includes all process waste water with the exception of the bccw (see R. 2740). It is made up primarily of waste water from the decolorization step, but also includes such miscellaneous streams as floor washings (if they are not completely recovered), truck and car wash water, and boiler blowdown (R. 3174).

The principal pollutant properties or constituents of process waste waters are biochemical oxygen demand (BOD_5),[3/] suspended solids (TSS),

3/ BOD is a measure of organic pollutional effects, although it is on occasion referred to as a pollutant. See, e.g. 40 C.F.R. sec. 128.121 (1974). BOD measures the oxygen-consuming capabilities of organic matter which will occur as the matter decomposes. BOD_5 is a measure of the oxygen-demand of the organic matter after a five-day period, and is one of the most common measurements employed in the waste water field.

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and pH, which is a measurement of the acidity or alkalinity of the discharge. Process water is a relatively low volume, high strength waste stream (see R. 3172). Bccw represents the largest volume of water used in cane sugar refining (R. 3142), but is relatively lower in pollutant concentration or loading (see R. 3169). Process water contributes about 44 percent of the BOD5 raw waste loading [4/] and about 14 percent of the TSS raw waste loading. Bccw, even though lower in strength, contributes over 30 percent of the BOD5 raw waste loading due to its large volume (see R. 3217).

SUMMARY OF ARGUMENT

Petitioner Amstar presents several technical issues to this Court not presented to the Agency prior to the promulgation of the regulations challenged herein. These issues are thus not properly a part of the instant action which must determine the reasonableness of the Agency's action based on the administrative record of the promulgation. Moreover, Amstar would not be denied a forum in which to raise its issues if this Court does not consider them now. Rather, the issues can

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Sugar is by no means a harmless pollutant in that it contributes BOD5 to waste water. An EPA primer on waste water treatment notes, "The life and death of any body of water depends mainly upon its ability to maintain a certain amount of dissolved oxygen. *** Since dissolved oxygen is the key element in the life of the water, the demands on it are used as a measure in telling how well a sewage treatment plant is working." "A Primer on Waste Water Treatment," EPA, Water Quality Office, Revised March 1971, CWA-12, U.S. Gov't. Printing Office. Emphasis supplied.

4/ Raw waste loading refers to the quantity of a particular pollutant present in untreated (raw) waste waters.

be more appropriately considered by EPA in determining whether the regulations should be revised. If Amstar is dissatisfied with the Agency's action or inaction, it can seek review in this Court.

The BPT limitations for the crystalline cane sugar refining subcategory are based on the application of the activated sludge treatment process. Although this technology had not been employed at a full-scale U.S. refinery at the time of promulgation, its transferability to the industry and its treatment effectiveness were reasonably predicated on the bases of its use in related industries with similar high carbonaceous wastes, in municipal treatment systems that receive cane sugar refining process water, in combined cane sugar factory-refineries, and in bench and pilot scale applications for the treatment of cane sugar waste waters. Since the promulgation of the regulations, EPA has learned that the activated sludge process has been successfully employed in a foreign cane sugar refinery and that it is being installed at several domestic refineries.

The BAT limitations are based on cooling and recycling bccw and the use of sand filtration. The availability of cooling and recycling bccw is well demonstrated by the fact that when the instant regulations were promulgated, five cane sugar refineries already employed the technology. Although sand filtration had not been employed in the cane sugar refining industry when the regulations were promulgated, it had been used in numerous other industries with similar pertinent characteristics. Also, the cane sugar refining industry itself employed a filtration technique in their production process that is very similar to sand filtration and petitioner C&H now plans to employ sand filtration.

Petitioners present a multitude of arguments to support their contention that EPA did not adequately consider potential adverse environmental effects and costs of implementation. In our response, we examine these numerous arguments and demonstrate that individually each is lacking in substantive merit. We show that in fact EPA has, on the record, carefully evaluated potential adverse environmental effects and costs.

ARGUMENT

I

THE REGULATIONS CHALLENGED HEREIN ARE REVIEWABLE IN THE COURT OF APPEALS AND THEY NEED NOT BE EXPRESSED AS A RANGE OF NUMBERS

A. The cane sugar refining regulations were properly issued under Section 301 of the FWPCA, as well as Section 304, and therefore are reviewable in the Court of Appeals. - C&H challenges EPA's authority to issue effluent limitation guidelines as regulations pursuant to Section 301 of the Act (C&H opening brief at 1, henceforth "C&H"). C&H concedes as it must that this Court has already held that EPA may issue effluent limitations as regulations under Section 301 and that such regulations are reviewable exclusively in the Court of Appeals. Hooker Chemicals and Plastics Corp. v. Train, 8 E.R.C. 1961 (C.A. 2, 1976).

EPA accepts the holding in Hooker and suggests that it is dispositive on this issue.[5/]

B. EPA complied with Section 304 in issuing single number limitations and specifying factors. - C&H argues that EPA failed to comply with section 304 of the Act by not specifying the factors to be taken into account in designating the treatment technology to be applied to point sources and in issuing single number limitations as opposed to ranges of limitations." (C&H at 2.) Once again C&H concedes that this Court upheld EPA's positions on these questions in Hooker, 8. E.R.C. at 1967-68 (C&H at 23).[6/]

5/ We note that five Courts of Appeal agree with the Second Circuit that EPA may issue effluent limitations as regulations under Section 301 and that such regulations are reviewable exclusively in Courts of Appeals. American Frozen Food Institute v. Train, 8 E.R.C. 1993 (C.A.D.C., 1976); American Iron and Steel Institute v. EPA, 526 F.2d 1027 (C.A. 3, 1975); E.I. DuPont de Nemours v. Train, 528 F.2d 1136 (C.A. 4, 1975)("DuPont I"); American Meat Institute v. EPA, 526 F.2d 442 (C.A. 7, 1975); American Petroleum Institute v. Train, 526 F.2d 1343 (C.A. 10, 1976) ("American Petroleum Institute I"). Contra, CPC International, Inc. v. Train, 515 F.2d 1032 (C.A. 8, 1975) ("CPC I"). The Supreme Court has agreed to decide the issue in E.I. DuPont de Nemours v. Train, supra, cert. granted, 44 U.S.L.W. 3585 (April 19, 1976) and E.I. DuPont de Nemours v. Train, 8 E.R.C. 1718 (C.A. 4, 1976) ("DuPont II") cert. granted, 44 U.S.L.W. 3733-3734 (June 21, 1976).

6/ We note that three other Circuits agree with this Circuit that an effluent limitation guideline can be a single number rather than a range. American Frozen Food; DuPont II; American Petroleum Institute v. EPA, ___ F. 2d ___ (C.A. 10, August 11, 1976) ("American Petroleum Institute II"); contra, American Iron and Steel Institute. This issue may be addressed by Supreme Court in its consideration of DuPont I and DuPont II.

II

THE ISSUES RAISED BY AMSTAR SHOULD NOT BE REVIEWED BY THIS COURT UNTIL THEY ARE INITIALLY CONSIDERED BY EPA

Amstar argues two substantive propositions in its brief. First, it contends that cooling towers are not justifiable as BAT in view of alleged immense costs compared to slight incremental reductions in BOD5 discharges. Second, Amstar contends that the logarithmic average method is a more appropriate method for monitoring compliance with the limitations than is the arithmetic mean averaging method. Significantly, however, Amstar does not request that this Court overturn EPA on either issue. Rather it only requests that this Court order EPA to take additional evidence on these matters as part of the Agency's ongoing reconsideration of the limitations. 7/

With respect to its first issue concerning alleged unjustifiable costs for cooling towers, Amstar states:

> Recent data filed by Amstar with the EPA ... shows that in 1975, without cooling towers, Amstar's refineries at Brooklyn and Philadelphia came within roughly one percent ... of meeting the 1983 BOD5 limitations. In other words, if the refineries were able to effect a further reduction in BOD5 discharge of 1% of their total raw wastes, or if the 1983 BOD5 limitations were only slightly adjusted, the refineries would be in full compliance for 1983, without having to engage in the construction and operation of cooling towers. . . . [Amstar opening brief at 22, henceforth "Amstar," emphasis in original.]

7/ In regard to the second issue, Amstar also requests a remand to reconsider the costs of installing cooling towers in urban locations. It alleges that EPA's previous consideration of this question was deficient. Amstar opening brief at 23. We have responded to this issue in Section V(B) of this brief. Also, as discussed in this section, infra, it is unlikely that Amstar will actually have to install cooling towers at its urban refineries since it has practically attained BAT as of 1975 and has over six years to improve in-plant controls to make the slight additional reductions in BOD5 needed to meet BAT.

To obtain what it regards as only a "minimal incremental reduction in BOD5", Amstar estimates costs on the order of $10 million for construction and $2 million annually for operation (Amstar at 15 and 22).

With respect to the second issue concerning the appropriate method for monitoring for compliance, Amstar argues that the logarithmic average method more accurately describes the sugar effluent than does the arithmetic. Amstar concedes, however, that the logarithmic average issue was not formally considered by EPA during its promulgation of these regulations (Amstar at 24).

In effect, what Amstar seeks is a revision of the limitations based on information that became available subsequent to the original promulgation. Under these circumstances the proper procedure is for Amstar to present the information to EPA for the Agency to determine initially whether a revision is warranted. Amstar seems to acknowledge as much, but nevertheless feels compelled to make its arguments in the context of this litigation. Apparently, Amstar believes that not arguing the issues here would jeopardize its right to obtain judicial review later. While it is true that Section 509(b)(1) generally requires that a petition be filed within ninety days of the original promulgation, the Section permits a challenge after ninety days if it is based solely on grounds which arose after the ninetieth day. Thus Section 509(b)(1) provides Amstar with the means to present new data to the Agency initially, and return to this Court later if it is dissatisfied with the Agency's action or inaction.

The holding and reasoning of the D.C. Court of Appeals in Oljato Chapter v. Train, 515 F.2d 654 (C.A.D.C., 1975) provide persuasive support for our position on this matter. In that case, petitioner challenged EPA's refusal to revise its previously promulgated standards of performance for new coal-fired power plants. The challenge however did not come within the thirty day time period generally required by the Clean Air Act. 8/

The Court dismissed the petition without prejudice, holding that petitioner must first present to the Administrator of EPA any new information thought to justify revision. According to the Court, "Such a procedure would avoid litigation when the Administrator acceded to a request and, when he did not, it would present us with an administrative record, including the Administrator's views in a nonlitigation context, a judicially recognized distinction of importance." 515 F.2d at 666.

The Court noted that the petitioner had written a letter to the Administrator requesting a revision and EPA had responded with a denial. But this exchange of letters was held not to constitute a sufficient basis for the exercise of appellate jurisdiction. The Court stated:

> The arguments for both the Administrator and petitioners were developed largely during the litigation in the District Court, and are reflected in the briefs of the parties to this court. These facts and arguments are not, of course, in the record so far as the petition for review is concerned. Moreover, the Administrator has not had an opportunity to respond to many of petitioners' arguments outside the context of litigation, so there is danger that his present posture may be based on 'post hoc rationalizations' rather than reasoned responses. [515 F.2d at 667.]

8/ Section 307(b)(1) of the Clean Air Act, 42 U.S.C. Section 1857h-5 which is the model for Section 509(b)(1) of the FWPCA, provides: "Any such petition shall be filed within 30 days from the date of such promulgation, approval, or action, or after such date if such petition is based solely on grounds arising after such 30th day."

The holding in Oljato is based on sound reasoning which is applicable to the instant action. Thus, as in Oljato, this Court should dismiss without prejudice these issues presented by Amstar.

Further argument against remanding these two Amstar issues is provided by statutory requirements that EPA review effluent limitation guidelines and revise them if appropriate. 9/ In fact EPA is now reviewing the cane sugar refining regulations and has been supplied information by Amstar on the two issues raised herein (see Amstar at 29). It would be inappropriate for this Court to consider the same issues before the Agency has had the opportunity, at least initially, to make its review as required by statute. 10/

Contrary to Amstar's assertions, Section 509(c) is not applicable to this action (Amstar at 31 and 32). Section 509(c) provides in pertinent part: "[I]n any judicial proceeding brought under subsection (b) of this section of a determination under this Act required to be

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9/ Effluent limitations guidelines serve as Section 301 limitations and Section 304 guidelines. Section 301(d) directs that effluent limitations required to achieve BAT "shall be reviewed at least every five years and, if appropriate, revised. . . ." Section 304(b) directs the Administrator to promulgate guidelines for effluent limitations "and, at least annually thereafter, revise, if appropriate. . . ."

10/ Amstar complains that the firm Colin A. Houston & Associates was to have issued a report several months ago on the review, but its issuance has been delayed for "unspecified reasons." Amstar at 12. Amstar states, "It apparently will not be released until after petitioners' briefs are filed." Amstar at 12. In fact, the Houston firm has not yet finalized its draft report because it is awaiting the analyses of certain data and has requested other information that has not yet been received in its entirety. It is also felt that additional information may have to be requested. This includes information pertaining to the three cane sugar refineries currently known to be constructing biological treatment systems and more detailed information from Mitsui Sugar Co. of Japan, regarding its treatment plant that has been operational since 1972.

made on the record after notice and opportunity for hearing, . . ., the court may order such additional evidence (and evidence in rebuttal thereof) to be taken by the Administrator, in such manner and upon such terms as the Court may deem proper." (Emphasis supplied.) Thus Section 509(c) applies only to determinations "required to be made on the record after notice and opportunity for hearing." Since the promulgation of effluent limitation guidelines is not such a determination, Section 509(c) is not applicable.

We now briefly consider the two Amstar issues on the merits. Its first contention is that cooling towers are not justifiable as BAT in view of alleged immense costs compared to slight incremental reduction in the discharge of BOD5. In Section V(B) of this brief we dispute allegations of both petitioners that cooling towers are too costly. Amstar's allegation regarding slight incremental BOD5 reduction is based on information it presents in its brief showing that it is already close to meeting BAT limitations for BOD5. If BOD5 were further reduced by one percent of the total raw waste loads at the Brooklyn and Philadelphia refineries they "would be in full compliance for 1983." (Amstar at 22.) Additionally, the refinery at Baltimore is said to be meeting the 1983 BOD5 limit as of 1975 (Amstar at 22, n. 2).

Amstar's position seems to be that the costs of installing cooling towers are not worth a mere one percent additional decrease in

raw waste loads (or no decrease in the case of the Baltimore refinery). This, however, assumes that Amstar will only do the minimum required by law to reduce pollution. Otherwise it could install cooling towers in its refineries that already nearly meet BAT and reduce BOD5 well below the 1983 limitation.

If it chooses only to meet BAT, then cooling towers will probably not be necessary. When the limitations were promulgated in March of 1974, EPA believed that the achievement of BAT would require the installation of cooling towers. Amstar's actual experience in 1975, however, has shown that through in-plant controls two plants have nearly attained BAT and one actually has. 11/

Thus in the year beginning nine months after the promulgation of the cane sugar limitations, Amstar has almost achieved BAT. It would not seem unreasonable to conclude that within the next six years, Amstar can improve its in-plant controls to make the slight additional reductions in BOD5 necessary to meet BAT.

Amstar's second issue concerns its contention that the logarithmic average method, rather than the arithmetic, should be used to monitor for compliance. The logarithmic method is said to better describe the

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11/ This amounts to three of Amstar's five refineries. One of the two remaining refineries is located in Chalmette, Louisiana, admittedly a non-urban location. Amstar at 22, n. 2. This refinery would not experience the alleged immense costs required to install a cooling tower in an urban location. The fifth Amstar refinery, in Boston, Massachusetts, came within 20 percent of meeting the 1983 limit. This, however, was despite experiencing "unusual problems in 1975." Amstar at 22, n. 2.

sugar effluent, allegedly characterized by a wide range of numbers with a few relatively large values. The cane sugar effluent to which Amstar apparently refers is that discharged from its refineries, which employ in-plant controls to nearly meet BAT. However, EPA based the BAT limitations not only on in-plant controls, but also on the use of cooling towers and other applicable technologies. The arithmetic mean accurately describes the effluent discharged following treatment by these technologies. Furthermore, the potential problem of an atypically large number distorting an arithmetic average of the effluent discharged from the Amstar refineries can be alleviated simply by taking more samples on days of normal operation.

III

THE ACHIEVABILITY OF THE BPT LIMITATIONS HAS BEEN REASONABLY DEMONSTRATED BY EPA

A. Introduction. - This Court has already reviewed and discussed the statutory requirements under Sections 301(b)(1)(A) and 304(b) relating to the effluent limitations which must be achieved by July 1, 1977, based upon best practicable control technology currently available (BPT) in Hooker Chemicals v. Train, __ F.2d ____, 8 E.R.C. 1961, 1962-1963, and 1966-1969 (C.A. 2, 1976). This Court there upheld EPA's definition of BPT as "the average of the best existing performance of various plants," observing that this definition comes directly from the legislative history. 8 E.R.C. at 1969. This Court further held

that "A consideration of plants which is confined to those characterised as 'exemplary' is not a cognizable deviation from the norm of 'best existing performance.' American Meat Institute, supra [526 F.2d 442] at 453, 462; American Iron and Steel, supra [526 F.2d 1027] at 1057." Id. This Court further held that precise mathematical averaging need not appear in the record so long as "the path of administrative proceedings may reasonably be discerned." 8 E.R.C. at 1970.

As the Seventh Circuit held in American Meat Institute v. EPA, supra, the technology utilized in determining BPT need not actually be in use in the industry if it can be readily transferred from another industry. 526 F.2d at 453. This authority, the Court noted, stems directly from the legislative history. Senator Muskie, in his written report to the Senate explaining the discretion given to the Agency in establishing BPT levels, stated:

> "In those industrial categories when present practices are uniformly inadequate, the Administrator should interpret 'best practicable' to require higher levels of control than any currently in place if he determines that the technology to achieve these higher levels can be practicably applied ....' Leg. Hist. 169-170." [526 F.2d at 453.]

BPT limits for new plants have been upheld if in the Administrator's reasoned judgment they are attainable, even where the controls specified by EPA are not in use in any one plant. CPC I, supra, 515 F.2d at 1046, 1047 (C.A. 8, 1975). Accord, for existing plants, Tanners' Council v. Train, __ F.2d ____, 8 E.R.C. 1881, 1883 (C.A. 4, 1976).

Although the 1977 BPT limitations contemplate for the most part external, or "end-of-pipe" treatment measures, use of internal controls may also be required if this is normal practice within the

industry. See American Paper Institute v. Train, __ F.2d ____, 9 E.R.C. 1065 (C.A.D.C., 1976), upholding requirement that pulp and paper industry dischargers make extensive internal equipment changes in order to comply with BPT limitations; see also this Court's memorandum of June 14, 1976, in Hooker Chemicals, supra, slip. op.

C&H has challenged the BPT limitations for cane sugar refining on the basis that EPA has failed to demonstrate their achievability.[12/] In refuting this allegation and demonstrating the reasonableness of the BPT limitations, we first describe the process by which the limitations were formulated. We then summarize the information on which they are based and respond to C&H's numerous criticisms thereto. Finally, we present some of the information that has become available subsequent to the original promulgation of the limitations which confirms their reasonableness.

B. EPA derived the BPT limitations through a three step process. In the first step, EPA evaluated many applicable treatment concepts in cane sugar refining and other industries before determining that activated sludge treatment is appropriately one measure[13/] constituting

12/ It is unclear whether C&H has challenged the BPT limitation for TSS as well as that for BOD5. If the TSS limitation has been challenged, it is apparently on the basis of anticipated sludge separation or bulking problems associated with biological treatment. Amstar and Sucrest do not challenge either BPT limitation.

13/ The other three measures, not challenged by C&H (C&H at 25), are listed in the "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Cane Sugar Refining Segment of the Sugar Processing Point Source Category," March 1974, R. 3260 (henceforth, "cane sugar refining development document").

the best practicable control technology currently available for cane sugar refining. The activated sludge process is utilized by thousands of waste treatment plants and is an acknowledged method for biological or secondary treatment.[14/] Although it had not been used at a U.S. cane sugar refinery when the limitations were promulgated, its transferability to the industry and its treatment effectiveness were reasonably predicted by EPA on the basis of its use in related industries with similar high carbonaceous wastes, in municipal treatment systems that receive cane sugar process water, in combined cane sugar factory-refineries, and in bench and pilot scale applications for the treatment of cane sugar waste waters.[15/]

In establishing a model refinery, the second step in the process, EPA conducted a thorough review of available information from cane sugar refineries regarding production processes, raw waste loads, applicable waste water control technologies, and costs associated with the application of the technologies. The actual figures chosen to characterize the model refineries were based on average, rather than exemplary, water usage and BOD5 and TSS raw waste loadings (R. 3258). A conservative approach was

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14/ A general description of the activated sludge process and other biological treatment processes appears in the cane sugar refining development document, R. 3199-3204.

15/ The statute does not require that the technology actually be in use within the particular industry in question for it to serve as the basis of an effluent limitation guideline. The Senate Report states:

> By the term "currently available" the Committee means a control technology, which, by demonstration projects, pilot plants, and general use, has demonstrated a reasonable level of engineering and economic confidence in the ability of the process at the time of actual commencement of actual construction of the control facilities. ["A Legislative History of the Water Pollution Control Act Amendments of 1972," Sen. No. 93-1, Senate Committee on Public Works (1973) at 788; henceforth "Leg. Hist."]

taken because the regulations were based on a technology not known to be in actual use at any cane sugar refinery at the time the regulations were promulgated (R. 3258). Among the numbers established for the model refineries from data on existing plants (see R. 2133-2139) were raw waste effluent concentrations for BOD5 and TSS in the process water of approximately 560 mg/l and 890 mg/l, respectively.

In the third step of the limitations setting process, EPA developed engineering calculations for the levels of BOD5 and TSS that could be attained by applying the identified technologies to the two major discharge streams. With respect to the barometric condenser cooling water (bccw) stream, it was determined that a discharge level of .34 kilograms (kg) of BOD5 per metric ton (kkg) of melt was attainable (R. 3120). This is equivalent to a concentration of 10 milligrams (mg) of BOD5 per liter (l) at the model bccw flow (see R. 3259). With respect to the process water stream, discharge levels of .09 kg of BOD5 and .09 kg of TSS per kkg of melt were found to be practicable (see R. 3119-3120). These values are equivalent to concentrations of 60 mg/l at the model process water flow (see R. 3259). [16/] The final BPT limitations of .43 kg of BOD5 and .09 kg of TSS represent the sum of the amounts attributable to the two streams (see R. 3119 and 3259).

To meet these final limitations it is not necessary for individual plants to duplicate the numbers used by EPA in its model for

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16/ 60 mg/l is the number used in the text, infra, to make comparisons to the level of treatment achieved by activated sludge in various other industries and categories.

raw waste loadings, water usage, or treatment efficiencies. For example, an individual refinery could meet the overall limitations even if its process water BOD5 discharge is above the EPA projection, so long as its bccw BOD5 discharge is below the EPA projection by an equal amount. The bccw BOD5 discharge can in fact be reduced below the EPA projections through in-plant controls. 17/

C. Information contained in the record regarding the activated sludge process shows that it can be employed in the cane sugar refining industry, in combination with the other measures identified by EPA as best practicable control technology, to achieve the BPT limitations. - In establishing the BPT limitations for the cane sugar refining industry, EPA considered the treatment results attained in related industries and categories. C&H has presented a multitude of technical arguments in an attempt to discount these results. We respond to C&H's criticisms below.

First, EPA examined treatment results attained in the beet sugar industry. It found that waste waters in that industry have been reported to be effectively treated by the activated sludge process, with maximum BOD5 values of 50 mg/l in the effluent (R. 125).

C&H, however, claims that the cane and beet sugar industries are not proper subjects for comparison. It states, "[N]o consideration

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17/ Amstar has achieved such reductions through in-plant controls. Amstar at 11 and Amstar, Appendix A.

was given to the fact that most beet sugar wastes (Steffen process wastes, agricultural weeds, mud, transport and washing trash) are not common to cane sugar refineries." (C&H at 30.) But, C&H does not explain to the Court that Steffen wastes are not generally part of the process waste water discharge which would be treated by the biological process. In fact, these wastes are "universally concentrated for byproduct recovery or disposed of on land without discharge to navigable waters." (R. 3309, see also R. 3345 and 3355.) The agricultural weeds, mud, and transport and washing trash in beet sugar processing wastes are not distinguishing factors regarding biological treatment. They are typically removed through primary treatment practices--screening and sedimentation--prior to discharge to a biological treatment system (see R. 3349, 3357, and 3358).

Thus the alleged differences between cane and beet sugar wastes are not important regarding biological treatment. What is important in this regard is the fact that dissolved sugars are the major organic constituents of the wastes of both industries (see R. 3169, 3172, 3321, 3325).[18/]

C&H's criticisms of the beet sugar comparison continues with the following statement: "More importantly, EPA does not recommend biological treatment in the beet sugar industry even for the two wastes which are common [to both industries], barometric condenser water and

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18/ A consultant to United States Cane Sugar Refiners' Association ("USUSRA") referred to the characteristics of the waste water of the sugar beet and cane sugar industries as "essentially identical." R. 2949.

calcium carbonate wastes." (C&H at 30.) This statement conveys a wholly inaccurate impression. Biological treatment or any other treatment of barometric condenser cooling water (bccw) is not required for beet sugar because BPT for that industry generally requires the recycle of bccw and total containment or zero discharge of any wastes (R. 3406). On the other hand, BPT and BAT for cane sugar refining allow a discharge with respect to bccw after controls and treatment are applied. As to calcium carbonate wastes (filter cakes or slurry), the effluent limitations for the two industries are based on the same thing - total elimination of the discharge (R. 3260 and 3406).

In yet another attack on the beet and cane sugar comparison, C&H quotes the following statement from the final development document for beet sugar: "For reasons developed within the document such as the varying and seasonal nature of the waste and adaptability of conventional treatment measures to beet sugar processing, conventional biological treatment has generally proved to be unsuccessful to date [sic]." 19/ The word "unsuccessful" appearing in the quotation above refers not to the technical or economic feasibility of biological treatment, but rather to the fact that due to special circumstances in the beet sugar industry, land disposal is a more economic and practical treatment alternative. This is due primarily to the fact that most beet sugar processors are located in rural areas, where land is readily available.

19/ C&H at 31, quoting "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Beet Sugar Processing Subcategory of the Sugar Processing Point Source Category," January 1974, at 131; henceforth, "beet sugar development document."

Another factor making biological treatment a less favorable alternative is the seasonal nature of beet sugar processing (see R. 3303). Thus the sentence preceeding the one quoted by C&H reads: "Furthermore, disposal by land application of beet sugar processing waste waters has obvious benefits of cost-effectiveness and practical application as compared to utilization of conventional biological treatment measures." (Beet sugar development document at 131.) And on the preceeding page it is stated, "Land disposal of process waste waters is an integral part of the best practicable control technology currently available for the beet sugar processing subcategory as evidenced by present widespread use." (Beet sugar development document at 130.)

Other industries providing support for the cane sugar refining limitations are the apple, citrus, and potato segment of the canned and preserved fruits and vegetables processing point source category. First, as a basis for comparison, it should be noted that the wastes from these industries are similar to those from cane sugar. In the case of apple and citrus (R. 125), natural sugars are present in the process waste waters. The wastes from the potato processing industry contain a high quantity of carbohydrates. 20/

Activated sludge has been employed by some plants in all three of these industries to attain excellent results. It is reported that "[a]ctivated sludge treatment plants are capable of removing 90 to 95 percent or better of the influent BOD5 from fruit and vegetable processing

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20/ Sugar is defined as comprising the simpler carbohydrates. Webster's Third International Dictionary (Unabridged Edition 1967). Furthermore, USCSRA's own consultant states that "potato processing wastewaters. . . are similar in nature to beet sugar wastes" R. 2949, which he also equates with cane sugar industry wastes. R. 2949.

plants." [21] BOD5 removal efficiencies of over 95 percent have been experienced on apple processing wastes with nutrient addition (citrus, apple, and potato development document at 101). Potato and citrus wastes have been treated by the activated sludge method, yielding BOD5 reductions as high as 95 and 97 percent respectively (citrus, apple, and potato development document at 101).

Also, data on the apple, citrus, and potato industries show that sixteen of eighteen plants considered achieved BOD5 removal efficiencies greater than 85 percent and thirteen attained efficiencies of 89 percent or greater (citrus, apple, and potato development document at 109, Table 25). Thus EPA concluded that "similar effectiveness of each type of treatment for the wastes generated by each commodity indicates similar treatability of canned and preserved fruit and vegetable wastes" (citrus, apple, and potato development document at 108) - which reliably suggests that other similar wastes (such as those generated in cane sugar refining) are biologically treatable to the same degree with proper design, operation, and attention to other related waste water control fundamentals.

With respect to the comparisons EPA has made to the citrus, apple, and potato segment, C&H alleges that BPT for that segment requires average BOD5 removal efficiencies between 84 and 94 percent (C&H at 34), [22]

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[21] "Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Citrus, Apple, and Potato Segment of the Canned and Preserved Fruits and Vegetables Processing Point Source Category," U.S. EPA, November 1973, at 101; henceforth, "citrus, apple, and potato development document." This document is referenced in the cane sugar refining development document at R. 3272.

[22] According to our calculations, the range is actually 85 to 94 percent.

whereas the treatment efficiencies for crystalline cane sugar refineries are said to be 95 percent and higher (C&H at 35). Thus, according to C&H, EPA has required a more stringent treatment efficiency for an industry that has never used biological treatment than for industries that do employ the process. On the contrary, the treatment efficiency required for the model cane sugar refinery to achieve BPT is not 95 percent. Rather it is 76.8 percent if both process water and bccw are appropriately considered. 23/ If process water alone is considered, the treatment efficiency is 89 percent. 24/

23/ This number is presented at R. 3231, Table 20, alternative D. See also R. 3229, Table 18, alternative D. This number is derived by determining the amount of BOD5 removed by the application of BPT and dividing it by the amount of BOD5 in the raw wastes. 1.85 kilograms (kg) of BOD5 per metric ton (kkg) of melt is the amount of BOD5 in the raw wastes of the model refinery. R. 3229. Subtract from this .43 kg of BOD5 per kkg of melt, the amount discharged after application of BPT (R. 3229), to obtain 1.42, the amount removed. 1.42 divided by 1.85 yields .768 which converts to 76.8 percent.

24/ The 89 percent number is based on the model plant which was determined to have an influent process water concentration of 560 mg/l of BOD5 which could be treated to 60 mg/l of BOD5. Because C&H apparently has an unusually high influent (1200 to 1500 mg/l; C&H at 29), its treatment efficiency would be on the order of 95 percent, if it actually had to attain a process water discharge of 60 mg/l of BOD5. However, as discussed in the text supra at III(B), the overall limitation is based on model contributions of BOD5 from the two separate discharge streams--bccw and process water. C&H has reported that due to the quantities of BOD5 discharged in their bccw, it will be possible for C&H to discharge a treated process water effluent of 115 mg/l of BOD5 and still attain the BPT limitation. R. 2775.

This flexibility in achieving the overall limitations, discussed previously in text supra at III(B), was noted by EPA in the following statement:

> It is possible for plants to achieve the indicated final effluent waste loadings by operating at lower average treatment efficiencies but receiving lower pollutional raw waste loadings and/or using less process or barometric condenser cooling water. R. 3259.

Therefore, many options are available to industry in achieving the effluent limitations and petitioner's inference that a 95 percent removal efficiency will be required is without merit.

C&H complains that the level of treatment efficiencies achieved in the apple, citrus, and potato segment "include the impact of screening in advance of biological treatment." (C&H at 34 and 35.) Screening is an extremely basic form of primary treatment which serves to remove very large materials such as rocks, boards, rags, and trash that can damage equipment used in biological treatment. Screens are not needed in the treatment of cane sugar refinery wastes since large and potentially damaging materials are not present.

Dairy product processing is another industry that provides support for the BPT limitations for cane sugar refining. Data from eight dairy processing plants pertaining to the treatment of waste waters by the activated sludge or other biological treatment processes, show that wastes with influent concentrations of BOD5 on the order of 590 to 1910 mg/l have been successfully treated, with seven of the eight plants achieving levels of 14 to 52 mg/l (R. 3511). BOD5 reductions ranged from 91.9 to 98.7 percent. Effluent TSS were reduced to levels of 18 to 108 mg/l, with all activated sludge plants attaining values less than 32 mg/l (R. 3511). Other data are presented which show that influent BOD5 concentrations are reduced from values in the range of 827 to 2,000 mg/l to below 40 mg/l by the application of the activated sludge or other biological processes (R. 3515).

Once again C&H attempts to discount these results with its stock criticism that the wastes being compared are dissimilar. However, dairy processing wastes are highly carbonaceous, as are cane sugar refining wastes. The presence of fats and proteins in the dairy processing

wastes is not a distinguishing factor. Rather, along with other dairy processing wastes, they simply provide a source of nutrients not naturally present in cane sugar refining wastes. EPA, recognizing that sugar refining wastes are nutrient deficient (R. 3199), stated that this deficiency can be readily corrected by the addition of nitrogen and phosphorus in the proper balance (R. 3199). In fact this is a standard procedure in treating nutrient deficient wastes such as cane sugar wastes (Wastewater Engineering, Metcalf & Eddy, Inc., McGraw-Hill, New York, 1972, at 385).

C&H further states that the final development document for the dairy subcategory notes that BOD5 removal may drop to the 30 percent level when sudden, highly concentrated waste loads are introduced (C&H at 35, n. 16). Obviously the release of sudden, highly concentrated waste loads is not an exemplary practice. Moreover, viewing the quoted statement in its proper context shows that the point EPA was making is that properly designed and operated treatment systems must be employed to obtain consistently high BOD5 reductions through biological treatment. 25/

25/ The following provides the context of the sentence mentioned by C&H:

> Available data show that it is possible to achieve BOD5 reduction efficiencies greater than 99% part of the time with almost any of the types of biological waste treatment that are available. However, due to the high variability of the composition of dairy effluents these same treatment systems can have BOD5 reduction efficiencies as low as 30% during other times, such as after sudden, highly concentrated loads are discharged or other causes of severe upset occur.
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> To obtain consistent high BOD5 removal, it is essential to allow microorganisms to biodegrade organic matter under favorable operating conditions. These include properly designed and operated treatment systems to prevent shock loads and to allow microorganisms to function under well balanced conditions; addition of nutrients if absent .... With such practices, consistently high reductions should be attained.... ["Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Dairy Product Processing Point Source Category," May 1974 at 97]

The BPT limitations for cane sugar refining are also supported by treatment results experienced in the grain processing subcategory (R. 3101, and 3445-3505). Disagreeing with this conclusion, C&H quotes the grain processing development document for the proposition that biological treatment at the three plants (A, B, and C) discussed "produced no evidence of the process consistently yielding results of the quality demanded of sugar refineries." (C&H at 31 and 32.)

But in its discussion of this point, C&H concedes that at corn wet milling plant A, mentioned in the grain milling development document, the effluent BOD5 averaged 35 mg/l (C&H at 32). Further C&H concedes that the effluent concentrations at plant B were acceptable until a problem occurred (C&H at 32).[26/] C&H tries to negate these favorable results by noting that the EPA study showed that sludge bulking and treatment plant upsets occurred at plants A and B. However, EPA addresses these problems and specifies measures by which they can be controlled or eliminated (grain milling development document at 88 and 89). Moreover, the BPT limitations and associated technology for corn wet milling has been approved by the U.S. Court of Appeals for the Eighth Circuit in both CPC I and II.[27/]

26/ Although there was only limited data available on plant C at the time of publication of "Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Grain Processing Segment of the Grain Mills Point Source Category," December 1973; henceforth, "grain milling development document," additional data was compiled by EPA in its remand document for CPC II as discussed at page 9 of that decision.

27/ CPC II (CPC International, Inc. v. Train ___ F.2d ___ (C.A. 8, August 18, 1976)) determined the validity of the new source standard for corn wet milling, part of which had been remanded in CPC I (CPC International, Inc. v. Train, 515 F.2d 1032 (C.A. 8, 1975).

In both of these cases, the Court was reviewing the new source standard for corn wet milling. That standard is governed by Section 306 as opposed to Sections 301 and 304 which govern the standard for existing plants. The new source standard however is based on the achievement of the BPT standard through biological treatment before the application of more advanced treatment. Thus, the Court reviewed BPT as a first step in reviewing the new source performance standards.

footnote cont'd on next page

The applicability of biological treatment to cane sugar refinery waste waters is also demonstrated by the fact that, when the limitations were promulgated, twelve cane sugar refineries discharged process waters to municipal biological treatment systems (R. 3212-3214). 28/ But according to C&H this statement is inconsistent with another EPA statement that "[c]onventional design criteria are not directly transferable from municipal treatment applications." (C&H at 35, quoting R.

Footnote cont'd from previous page

In Grain Processing Corporation v. Train, 407 F. Supp. 96 (S.D. Iowa 1976), the District Court remanded BPT for existing corn wet mills. The Court of Appeals in CPC International, Inc. v. Train, ____ F.2d ____ (C.A. 8, August 18, 1976) ("CPC II") took cognizance of this and stated that the decision which is on appeal to it "will be considered in due course." CPC II, slip op. at 7. Moreover, the District Court's opinion regarding BPT was based on the Court's misunderstanding of a particular statement made by EPA's counsel at oral argument which is set forth at 407 F. Supp. 105. The Court concluded from that statement that the corn wet milling standards were based on a direct application of municipal standards. Instead, the record fully supports the conclusion that EPA assessed the performance of existing facilities in setting BPT limitations. In this regard the Court of Appeals in CPC II stated that the supplemental record "discloses that two existing plants without all the available technology proposed for use in a treatment facility or appropriate in-plant controls have met or nearly met the 1977 guidelines." CPC II, slip op. at 8, emphasis supplied.

The two plants to which the Court referred are American Maize and CPC-Corpus Christi, plants A and C respectively in the original grain milling development document. (See Grain Milling-Phase I, Addendum to Supplement B, Court Record pages 3636 and 3642 in CPC I.) The operating data were for the years 1974 and 1975 (CPC II, slip op. at 8 and 9) and were presented in the EPA remand document in CPC II.

28/ Two additional cane sugar refineries may now discharge their process waters to municipal biological treatment systems. R. 3212.

3201.) The sentence following the one quoted by C&H in the cane sugar refining development document reads: "However, high levels of treatment efficiency are possible at design loadings normally employed in treating other types of high strength organic wastes." (R. 3201.)

In formulating the cane sugar refining BPT limitations, EPA also considered the effective results that biological treatment had produced with respect to combined raw sugar factory-refinery wastes. C&H notes that said treatment involves impoundage lagoons and not activated sludge, the technology envisioned for the cane sugar refining subcategory (C&H at 29). However, this nominal distinction is not important to the question of treatability. In fact, activated sludge simply speeds up the same natural biological processes that occur in the impoundage lagoons. That impoundage lagoons are a form of biological treatment is even conceded by C&H (C&H at 29).

Additional support for the cane sugar refining BPT limitations is provided by the fact that biological treatment of sugar wastes has been demonstrated in both bench and pilot scale tests (R. 125). A pilot study shows that waste water BOD5 concentrations of 800-1000 mg/l from a cane sugar factory could be reduced to from 20 to 40 mg/l (R. 125). A bench-scale (or laboratory scale) activated sludge system using supplemental nitrogen and phosphorus (nutrients, see R. 3187), removed BOD5 at a greater than 99 percent rate of efficiency from cane sugar factory waste waters (R. 3538-3546), yielding an average effluent BOD5 of 13 mg/l (R. 3546).

C&H indicates that EPA failed to document the effectiveness of biological treatment due, in part, to special sludge separation problems which could be encountered in the application of biological treatment in the cane sugar refining industry (C&H at 28). At the outset it should be noted that the C&H sludge separation complaints are highly speculative because they are not based on actual occurrences in the cane sugar refining industry. Additionally, EPA has explained that "general experience has been that biological solids separation problems can be avoided if the dissolved oxygen concentration remains above zero throughout the aeration basin, if strong, highly concentrated waste releases are minimized through proper management practices, and if sufficient amounts of nitrogen are present to maintain a critical nitrogen-to-BOD5 ratio." (R. 3201.)

Also with regard to the alleged sludge separation problem, it should be noted that a study appearing in the record concerning the amenability of cane sugar mill effluents to the activated sludge treatment process determined that excess sludge could be dewatered to form a manageable solid through conventional means (R. 3546). Also, the study determined that maintenance of a proper loading rate and a proper nutrient balance were essential to effective treatment and that under these conditions sludge separation was not a problem (R. 3540-3544).

D. Subsequent to the promulgation of the effluent limitations guidelines in March of 1974, information has become available that confirms their reasonableness. - Although this information is not a part of the record in this action, it should be given some weight. In

American Petroleum Institute II, supra, the Court held that new information could be introduced to establish that the EPA technologies are both practicable and currently available. American Petroleum Institute II, slip op. at 31. The Court, in Amoco Oil Co. v. EPA, 501 F.2d 722, 729, n. 10, noted that events subsequent to the filing of the record indicating the truth or accuracy of Agency predictions may properly be considered. Material submitted as an appendix to briefs on economic impact subsequent to promulgation of the effluent limitations guidelines at issue was held properly considered in American Iron and Steel Institute v. EPA, 526 F.2d 1027, 1055, n. 61 (C.A. 3, 1975), upholding EPA's economic impact assessment.

In holding that such evidence may be properly considered by the Courts of Appeals, these decisions do not stand for the proposition that such post-promulgation evidence may serve as a substitute for an otherwise absent record basis for a regulation, but rather that it can be used to confirm the accuracy of the basis that was indicated in the record.

Subsequent to the publication of the results of the laboratory work of Dr. J. Hemens and D.E. Simpson (R. 3538 to 3546) of the Natal Institute for Water Research, it was determined from correspondence with Dr. Hemens that full-scale biological treatment systems were in operation and treating cane sugar waste waters (Appendix B, Exhibit 1). Full-scale biological treatment systems are being employed at two cane sugar mills [29/]

29/ The wastes from cane sugar milling and refining consist principally of dissolved sugar derived from sugar cane. The milling wastes, however, are generally more highly concentrated and thus more difficult to treat.

in Natal, South Africa. [30] "Both produce effluents with a C.O.D. [chemical oxygen demand] [31] around 100 mg/l...." (Appendix B, Exhibit 1.) This is equivalent to about 13 mg/l of BOD_5 at the COD to BOD_5 ratio for treated cane sugar waste waters determined by the experimental works of Hemens and Simpson (R. 3546). Another full-scale activated sludge unit, designed on the basis of the laboratory work of Hemens and Simpson [32] (R. 3538-3546), was expected to be finished in 1976 (Appendix B, Exhibit 2).

It was recently determined that a full-scale activated sludge treatment system is being employed in Okayama, Japan, at a cane sugar refinery owned by the Mitsui Sugar Co., Ltd. [33] This facility was

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30/ Appendix B, Exhibit 1. One of the systems is a Pasveer ditch activated sludge system and the other is a two-step biological trickling filter.

31/ BOD was previously defined in footnote 3 as a measure of a waste waters' oxygen consuming capability. COD is a different measure of this capacity. COD to BOD ratios are frequently calculated in the field of wastewater engineering. See, Agricultural Waste Management, Loehr, Raymond C., Academic Press, N.Y. (1974) at 152-153.

32/ The results of the work of Hemens and Simpson were further substantiated by the work of J. Bruijn. Bruijn noted that biological treatment of cane sugar factory effluent "was found to be suitable provided additional nitrogen and phosphorous were added." "Treatment of Sugar Factor Effluent in Biological Trickling Filters," Proceedings of the South African Sugar Technologists' Association, June/July 1975.

33/ The propriety of considering data from foreign plants was upheld by the Court of Appeals for the District of Columbia in American Frozen Food Institute v. Train, __ F.2d ____, 8 E.R.C. 1993, 2009 (C.A.D.C., 1976) (upholding effluent limitations guidelines for the potato processing industry).

designed to reduce COD from 1500 mg/l to a maximum of 100 mg/l. A TSS level of less than 100 mg/l was also a part of the design. After six months of operation, COD removal has remained greater than 95 percent. The highest reported values of COD are on the order of 80 to 90 mg/l, with all other values reported to be less than 60 mg/l. This 90 mg/l of COD converts to 13 mg/l of BOD_5 using the COD to BOD_5 ratio developed by Hemens and Simpson. 34/ Therefore, in the worst situation, a treatability much better than that specified in the BPT effluent limitations is being achieved at a cane sugar refinery already employing activated sludge treatment.

Additionally, it should be noted that Amstar has stated that it has a treatment plant under construction at its plant in Chalmette, Louisiana, which will treat process water (Amstar at 8). Since Amstar does not challenge BPT it can only be assumed that it expects to meet the BPT limitations. It should also be noted that petitioner C&H is currently constructing and intends to use a biological treatment plant to treat its process waste water (C&H at App. B, 2).

In light of the extensive evidence supporting the BPT limitations issued by the Agency, they should be upheld by this Court.

34/ The various data cited for the Mitsui plant were either contained in or derived from tables and figures presented in the following article, "Treatment of the Waste Water by Activated Sludge Process," Research Society of Japanese Sugar Refineries' Technologists, May 1975. See Appendix C.

IV

THE ACHIEVABILITY OF THE BAT LIMITATIONS
HAS BEEN REASONABLY DEMONSTRATED BY EPA

The statutory authority conferred upon the Administrator relating to the 1983 BAT limitations was discussed by this Court in Hooker Chemicals v. Train, supra, 8 E.R.C. at 1962, 1972. The Court observed, as have other Circuits, that great latitude is allowed the Agency in projecting the technologies which will be available by that time frame:

> "We are mindful that Courts have been reluctant to set aside 1983 effluent limitations which are predicated on technology that is still in the development stage. See Tanners' Council of America, Inc. v. Train, __ F.2d ____, Slip op. at 14-17 [8 E.R.C. 1881] (4th Cir. March 10, 1976). Since technological innovations may transform what at present appears to be fantastic expectations into practical realities by 1983, such trepidation is understandable....
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> That no plant in a given industry has adopted a pollution control device which could be installed does not mean that that device is not 'available.' Congress did not intend to permit continuance of pollution by industries which have failed to cope with and attempt to solve the problem of polluted water. Section 304 (2)(A) itself explicitly mandates consideration by the Administrator of 'treatment techniques, process and procedure innovations' [emphasis added by the Court] in determining the degree of effluent reduction attainable by the application of the best control measures and practices. The Legislative History supports the plain meaning of this language. See, e.g., Leg. Hist. p. 170." [8 E.R.C. at 1971-1972.]

Technology may be based on a transfer from other industries as well as on only pilot plant data. American Iron and Steel Institute v. Train, supra, 526 F.2d at 1061. As the Seventh Circuit stated in American Meat Institute v. EPA, supra:

> In light of the stringent effluent limitations contemplated by the Act for 1983 and the declared national policy of eliminating the discharge of all pollutants by 1985 (sec. 101(a)), we believe that the EPA must be upheld if it can show the existence of some technology which, if implemented, may reasonably be expected to achieve the 1983 standards. [526 F.2d at 463.]

In Hooker Chemicals, the Court remanded several portions of the BAT limitations because of the absence of record evidence concerning the technology upon which EPA relied. In the present case, however, the record contains extensive evidence as to both the technology and the Agency's rationale for its use in support of the BAT limitations. Some of the principal elements of this record are discussed below where we identify the BAT limitations and respond to the contentions raised by petitioners.

The BAT limitation for BOD5 is .09 kg/kkg of melt (down from the BPT limitation of .43) and for TSS is .035 kg/kkg of melt (down from the BPT limitation of .09). Assuming the flow at the model refineries, the BOD5 limitation is equivalent to 40 mg/l and the TSS limitation is equivalent to 15 mg/l (see R. 3263). These BAT limitations are based on the degree of BOD5 reduction reasonably attainable through cooling and recycling bccw with biological treatment of the blowdown [35/] and the TSS reduction reasonably attainable through the addition of sand filtration to further treat the effluent from the biological system (R. 3264).

The technological feasibility of cooling and recycling bccw to achieve the BAT limitation for BOD5 apparently is not at issue in this

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35/ Blowdown refers to the discharge from a recycle stream. It is designed to prevent a large build-up of dissolved solids or other undesired contaminants in a recirculation system.

case. C&H has stated in the administrative record that the "use of cooling towers is an available technology." (R. 2777.) In fact, when the cane sugar refining limitations were promulgated in March of 1974, five cane sugar refineries already recycled their bccw through cooling devices.[36/] This technology is so practicable that it is BPT for the beet sugar, grain milling, and citrus industries (see R. 3406 and 3494 and citrus, apple and potato development document at 158).

That sand filtration is a practicable technology for the cane sugar refining industry is demonstrated by the fact that the industry employs a filtration technique in their process that is very similar to sand filtration[37/] and now C&H plans to use sand filtration itself as a means of further polishing the effluent from its biological treatment plant currently under construction (C&H, App. B at 3; see footnote 39, infra).

The technology's effectiveness for treating cane sugar refining wastes was demonstrated prior to the promulgation of the instant regulations by the results attained in numerous other industries (R. 3101). For instance the dairy processing development document reports that the plant employing sand filtration to treat the effluent of a biological treatment plant has

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36/ Three of these refineries (C-12, C-14, and L-5) used cooling towers and two (L-4 and CF-1) used spray devices. R. 3213-3214. At the time of promulgation three other refiners had recently completed installation of cooling devices (ponds or towers). R. 3213-3214, referring to refineries C-11, CF-3, and CF-4. It is likely that they are now employing these devices to recycle bccw.

37/ This filtration technique utilizes diatomaceous earth to further purify the sugar liquor by removing impurities (i.e., suspended solids). See R. 3125, 3140, and 3195. Diatomaceous earth is composed of nearly pure silica and consists of the cell walls of microscopic plants called diatoms. R. 3275. It has a smaller particle size than sand.

attained a TSS removal efficiency of 95.5 percent (R. 3514).[38] The citrus, apple, and potato development document lists expected TSS concentrations after the application of sand filtration to organic wastes in the range of 3 to 8 mg/l (citrus, apple, and potato development document at 129 and 130).

C&H cites CPC I for the proposition that "EPA's prediction as to the efficiency of deep bed filtration[39] was not a reasonable one on the basis of the record evidence." (C&H at 40, n. 18). However, in the CPC II remand decision of August 18, 1976, the Court unequivocally upheld deep bed filtration as a successfully demonstrated technology. Slip op. 10-15. In American Petroleum Institute II, the Court upheld a BPT limitation of 10 mg/l which was based on sand or granular media filtration of the effluent after biological treatment.[40] Slip op. 30-32.

38/ For comparison, the BAT limitations for crystalline cane sugar refining would require a TSS removal efficiency of 75 percent for the model plant. See R. 3259 and 3263.

39/ We agree with C&H's further statement that "deep bed filtration referred to is the technical equivalent of the sand filtration recommended for cane sugar refineries." C&H at 40, n. 18.

40/ "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category," U.S. E.P.A., April 1974, at 143-144. EPA referred to the successful application of sand filtration in the petroleum industry at R. 3101.

C&H's principal criticism of the BAT limitation for TSS appears to be that effective sand filtration will be thwarted by sludge bulking problems that will occur during biological treatment. However, as we explained in Section III, sludge bulking problems need not occur if proper design and operating procedures are employed (see R. 3540-3544). Further criticizing the BAT limitation for TSS, C&H quotes a statement from the cane sugar refining development document to the effect that rapid sand filters are subject to numerous operating problems (C&H at 38 and 39, quoting cane sugar refining development document at R. 3205). Understandably, C&H fails to quote the next two sentences in the cane sugar refining development document which read as follows:

> "Usually these problems can be minimized or eliminated by proper design and plant operation. Sand filters are well noted for their efficient removal of bacteria, color, turbidity, and large microorganisms." (R. 3205-3206.) 41/

In an additional criticism of the BAT limitations, C&H refers to an EPA statement admitting that there is "uncertainty at present of the ratio of soluble to insoluble BOD in the effluent from the biological treatment system." (C&H at 39.) Uncertainty as to this ratio has nothing to do with the question of how effectively sand filtration will reduce TSS levels. Rather it only concerns how much BOD_5 can be removed through sand filtration. It was due to this uncertainty that EPA

41/ The application of sand filtration to treat the effluent from a biological treatment system is designed to remove biological solids (i.e., bacteria and large microorganisms).

decided not to credit sand filtration with any BOD5 reduction at the time of promulgation. (R. 3263.) 42/

In light of the extensive evidence supporting the BAT limitations issued by the Agency, they should be upheld by this Court.

V

EPA ADEQUATELY CONSIDERED POTENTIAL ADVERSE ENVIRONMENTAL EFFECTS AND COSTS OF IMPLEMENTATION

A. Contrary to petitioners' contentions, EPA adequately considered the potential adverse environmental effects associated with the implementation of the designated treatment technologies. - C&H alleges that the biological treatment process will produce bacterial sludge and dry filter aid which will pose land use and solid waste disposal problems (C&H at 49-50). C&H suggests that these problems will be particularly severe for urban refineries, and that EPA's response to comments on this effect was inadequate (C&H at 50).

First of all, with respect to the contention that EPA failed to give adequate consideration to public comments (see also C&H at 47-48), there is no legal obligation upon the Agency to respond on the record to every comment submitted in the rulemaking process. Indeed

42/ Thus the cane sugar refiners are provided a safety margin for attaining the BAT limitation for BOD5 since sand filtration will reduce BOD5 by the amount of BOD5 that is contained in the suspended solids removed. See R. 3205. In fact the Court in CPC II slip op. at 14-15 examined the results of the use of sand filtration at an existing facility and concluded that it would enable corn wet mills to meet the BOD5 new source performance standard which requires a reduction in BOD5 over that required by BPT. The technology identified to provide this further reduction in BOD5 includes sand filtration (R. 3502).

under the Administrative Procedure Act there is no requirement that the Agency respond expressly to any comments at all. 5 U.S.C. sec. 553 requires only that the public be given "an opportunity to participate in the rulemaking through submission of written data, views, or arguments with or without opportunity for oral presentation. After consideration of the relevant matter presented, the Agency shall incorporate in the rules adopted a concise general statement of their basis and purpose."

C&H suggests that EPA had an affirmative duty to make an extensive response on this issue which it inadequately discharged, citing International Harvester Co. v. Ruckelshaus, 478 F.2d 615 (C.A.D.C., 1973), DuPont II, supra, and Portland Cement Association v. Ruckelshaus, 486 F.2d 375 (C.A.D.C., 1973) (C&H at 47 and 48). As a matter of policy and practice, EPA normally responds to the more significant comments received, either in the final development document or the preamble to the promulgated regulation or both. In the present case, it did both. Nothing in the above cited cases suggests any greater obligation. For example, in Portland Cement, the Court remanded the case because of the Agency's failure to respond at all to comments which the Court had found to be substantial and significant. At the same time it stated:

> We are not establishing any broad principle that EPA must respond to every comment made by manufacturers on the validity of its standards or the methodology and scientific basis for their formulation. [486 F.2d 375, 393.]

The Court went on to say that comments must pass a "threshhold of materiality" before the Agency must respond. 486 F.2d at 394.

Second, EPA's response to the rather sketchy and unsubstantiated comments submitted on potential adverse environmental effects was entirely adequate. C&H complains that EPA gave a "terse reply" to industry's comment that "settled activated bacterial sludge is very dilute, and its disposal is not simply a matter of landfill." (C&H at 50.)

EPA's response was "There are many ways in which settled activated bacterial sludge may be handled -- sludge thickening, rotary vacuum filtration, centrifugation, sludge drying -- with the resulting solids either landfilled or used as a soil supplement." 39 F.R. at 10523. Sludge disposal is simply not a serious problem. No substantive evidence was presented on the rulemaking record by industry or other public commenters documenting C&H's current allegation that it is or will be a serious problem for which no practicable solution exists. Under these circumstances the Agency's response was adequate.

Dilute, settled activated sludge has been handled on a routine basis for several decades at the thousands of activated sludge treatment plants that exist in this and other countries. Among the many ways it is handled are those specified by the Agency in its Federal Register response quoted above, such that the resulting solids are either landfilled or used as a soil supplement (R. 3102). There was also evidence in the record that excess settled sludge produced in a pilot scale

activated sludge system treating cane sugar mill effluents could be dried to a manageable solid without any form of pretreatment (R. 3545).

Furthermore, it should be pointed out that whatever problem may be encountered in sludge disposal will not be experienced at the twelve to fourteen urban refineries discharging waste waters into municipal treatment systems. With regard to the other refineries, there is no evidence in the record to indicate that the problem will be more severe in the cane sugar refining industry than it is for all the municipal and industrial biological treatment systems operating throughout the nation. 43/

43/ In fact our calculations based upon the BOD5 data and melt volume data in the record indicate that the volume of sludge that would be generated by even the large C&H Crockett plant will be relatively small -- the equivalent of about two truckloads of solid waste per day. This figure is derived by estimating the total incremental quantity of solid waste in the form of bacterial sludge that would be generated at the C&H refinery if biological treatment is employed.

It has been estimated that the quantity of bacterial solids produced by biological treatment ranges from 0.54 to 0.8 pounds of bacterial solids per pound of BOD5 in the influent to biological treatment. Agricultural Waste Management, Loehr, Raymond C., Academic Press, Inc., New York, N.Y., 1974, at p. 161. The influent BOD5 associated with the C&H refinery can be estimated by noting that the model refinery process water BOD5 discharge is 1.64 pounds of BOD5 per ton of melt. R. 3217. Using the melt figure of 4000 tons per day for the C&H refinery (C&H at 3) indicates that 6560 pounds of BOD5 are attributable to the C&H process water discharge. Using the upper limit, 0.8 pounds of bacterial solids per pound of BOD5 in the influent to biological treatment, indicates that C&H will generate about 5248 pounds of bacterial solids per day. Assuming that the sludge to be disposed of has 30 percent solids and 70 percent moisture (Wastewater Engineering, Metcalf & Eddy, Inc., McGraw-Hill Book Company, New York, 1972, at 304), yields 17,500 pounds of total solid waste to be disposed of per day. At a specific gravity of 1.03, 10.08 cubic yards of sludge are produced per day. This is about 2 truckloads of solid waste.

C&H calls EPA's consideration of energy usage "cavalier" and states that the estimates of energy consumption presented in the Federal Register promulgation are at "complete variance with those presented in the Development Document." (C&H at 51.) This is a flat misrepresentation based upon a mistaken comparison of data describing quite different phenomena.

From information presented in the cane sugar refining development document, C&H calculated the additional energy costs at an individual small crystalline refinery and an individual large crystalline refinery. The EPA estimate appearing in the Federal Register, however, was for additional energy consumption in the entire crystalline cane sugar refining subcategory. This estimate was based on a rigorous plant-by-plant analysis which assumed no incremental energy cost at the fifteen refineries considered to have already attained BPT at the time of promulgation of the regulations (R. 2246-2251). Under these circumstances, the EPA industry-wide estimate, expressed as a percentage, would quite naturally be much less than the C&H estimates for individual plants, as well as being more reasonable in representing the actual energy impact.

There is a far more pertinent comparison available which more accurately illustrates relative increase in energy consumption that will result from compliance with the cane sugar refining regulations. An inflationary impact statement must now be issued by EPA on regulations

which will increase national energy consumption by 25,000 barrels of oil a day (Federal Register at 41 FR 29081 and "EPA Guidelines on Inflation Impact Statements," July 9, 1976). The additional consumption of energy that will be required in the entire crystalline cane sugar refining industry to meet BPT is the equivalent of 19.6 barrels of oil per day and to meet BAT is 143 barrels per day. 44/ In contrast the energy consumed at the present time by this industry has been estimated to be equivalent to 20,000 barrels of oil per day. 45/ Obviously, the incremental increase in energy required to comply with the proposed regulations is insignificant when compared to present energy use levels within the industry.

C&H decries the "severe fogging and noise effects" that the operation of cooling towers allegedly can have, particularly in urban locations (C&H at 53 and 54). There is not a shread of evidence in the

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44/ This is derived from the following figures: an additional 3.93 million kilowatt hours per year (kwh/yr) of electricity will be required by the entire crystalline cane sugar refining industry to attain BPT and 28.6 million kwh/yr of electricity to attain BAT. R. 2250. The conversion factor employed is 25,000 barrels of oil per day equals 5 x 10^9 kilowatt hours per year. "EPA Guidelines on Inflation Impact Statements," July 9, 1976.

45/ It can be shown from the record that the crystalline cane sugar refining industry comprises 89 percent of the entire cane sugar refining industry. See, R. 3127. The entire cane sugar refining industry (crystalline and liquid) consumes 45 x 10^{12} BTU/yr. "Industrial Energy Study of Selected Food Industries," FEO/DOC, Contract No. 1401-0001-1652, July 1974, p. x-7. Therefore, the crystalline cane sugar refining industry accounts for an energy use of about 40 x 10^{12} BTU/yr., the equivalent of 20,000 barrels of oil per day based on the conversion factor: 25,000 barrels of oil per day equals 50 x 10^{12} BTU/yr. "EPA Guidelines on Inflation Impact Statements," July 9, 1976.

record to support this claim. Nowhere in the various comments submitted by C&H or the USCSRA is there any mention of any actual occurrences of fogging and noise problems, severe or otherwise, associated with the installation of cooling devices at cane sugar refineries. The record does contain comments such as: "Problems with fogging and noise could create more environmental problems. It is possible that cooling towers would not be acceptable because of fog drifting...." (R. 2776, emphasis added.)

Apart from this speculation, the record contains no evidence whatever that the alleged problems actually exist. Five cane sugar refineries recycle barometric condenser cooling water through cooling towers or spray ponds (R. 3213-3214). Nowhere in the record is there mention of problems associated with these systems. Refinery C-14 is a large urban, crystalline refinery (R. 2562) which processes 1870 tons (1700 kkg) of raw sugar melt per day (R. 3176). This refinery recycles bccw through a cooling tower (R. 3213). It has never been brought to EPA's attention that there are fogging and noise problems, severe or otherwise, associated with the cooling tower at this refinery.

In response to comments suggesting potential problems of this type, EPA did in fact look into the matter and responded in the preamble to the promulgated regulations. It concluded that it is most unlikely that such serious problems will occur as a result of installation of

cooling devices at any of the refineries. 46/ For those concerned about any possible fogging problem, EPA added this precautionary recommendation: "[fogging] is primarily a function of local climatic conditions.... Careful placement of the cooling device will eliminate most of the problems." (R. 3255.) However, if as anticipated proper placement does not alleviate the problem, "the use of a wet-dry tower can significantly reduce fog plumes," though at some additional expense (R. 3255).

There are several methods available to minimize noise levels, including tower placement techniques, reduction in fan speed through over-design, and the use of sound attenuation devices (R. 3255-3256).

The foregoing discussion demonstrates quite clearly that EPA has given adequate consideration to non-water quality effects, particularly in light of the scant record evidence offered by petitioners to document any of their apprehensions. The record shows that in fact no significant or "severe" non-water quality problems are likely to be caused through implementation of the cane sugar refining regulations.

46/ At only one refinery was there even a mention that fogging might be expected to occur. R. 2777. This is the small crystalline refinery which C&H operates in Aiea, Oahu, Hawaii. Rather than install a cooling tower, the State of Hawaii suggested that, because of the scarcity of water in the Aiea area, the alternative of reclaiming the refinery's condenser water through the irrigation of public parks and recreational facilities in the area be considered. EPA responded that the "EPA's guidelines limit only the quantity and quality of the pollutants which may be discharged. Dischargers may employ any technology, including land disposal or other alternatives, which will result in compliance with such limitations." See EPA responses (18) and (19), R. 3102.

B. Contrary to petitioners' contentions, EPA adequately considered the costs associated with the implementation of the designated technologies. - Amstar incorrectly asserts that the FWPCA requires EPA to undertake a detailed "cost-benefit analysis" to justify its effluent limitations guidelines; incorrectly indicates American Iron and Steel Institute v. EPA, 526 F.2d 1027 (C.A. 3, 1975) supports this proposition; and then concludes, again incorrectly, that the present regulations must fall for failure to quantify the environmental benefits (Amstar at 17-21).

First of all, the Third Circuit in American Iron and Steel Institute v. Train held, after reviewing the legislative history, that with respect to the 1977 BPT limitations, only a very general, "limited cost-benefit analysis" was required, which was intended "to limit the application of technology only when the additional degree of effluent reduction is wholly out of proportion to the costs of achieving such marginal level of reduction ...." 526 F.2d at 1051 [emphasis in original]. The Court went on to hold that for 1983 BAT limitations and new source performance standards no cost-benefit analysis or balancing test is required at all. 47/ 526 F.2d at 1051 and 1059, quoting directly from the legislative history.

47/ EPA did, in fact, perform a limited cost-to-reduction benefit analysis in the case of cane sugar refining. It was estimated that the capital cost associated with the implementation of BPT at all crystalline refineries would be $350 per kilogram per day of BOD_5 removed ($350/kg BOD_5/day). For BAT, this figure was $1050/kg BOD_5/day. (R. 2278-2288.)

Again citing the legislative history, the Court noted that with respect to the impact of this legislation, "There is no doubt that we will suffer some disruption in our economy because of our efforts; many marginal plants may be forced to close." 526 F.2d at 1052.

Nothing in this Court's decision in Hooker Chemicals v. Train, supra, requires the type of quantification of benefits for which Amstar contends. Indeed the reason why no such benefit assessment was required in the Act is apparent from a review of the declaration of goals and policy of the Act. While costs of treatment technology can be calculated with reasonable precision, it is impossible to put a price tag on clean water for drinking, fishing, swimming, or other use and enjoyment. Nor can one quantify the subtle but long-term effects on the health of human beings and other organisms, or the environment as a whole, from chronic exposure to polluted water. For this reason Congress declared as the number one national goal of the Act "that the discharge of pollutants into the navigable waters be eliminated by 1985" Sec. 101(a)(1).

Accordingly, the various appellate courts, while not always in unison in interpreting the Act, have generally agreed that the cost-benefit analysis for the 1977 regulations is extremely limited, and that for the 1983 regulations and new source performance standards there is no such requirement at all. See, e.g., American Petroleum Institute II, slip op. at 40-41. No court has required the type of benefit quantification apparently urged by petitioners. Precisely this argument was rejected by the Fourth Circuit in FMC Corporation v. Train, ___ F.2d ____, 8 E.R.C. 1731 (C.A. 4, 1976), where the Agency made no cost-benefit analysis:

> Petitioners assert that the statute is not satisfied unless the Administrator quantifies in monetary terms the benefits to be obtained by reducing pollution and compares this sum to the achievement cost. This Court in duPont v. Train [No. 74-1261], supra, has, however, rejected that argument. The Act's overriding objective of eliminating by 1985 the discharge of pollution into the waters of our Nation indicates that Congress, in its legislative wisdom, has determined that the many intangible benefits of clean water justify vesting the Administrator with broad discretion, just short of being arbitrary or capricious, in his consideration of the cost of pollution abatement. [8 E.R.C. at 1734.]

The court went on to hold that:

> While EPA must take seriously its statutory duty to consider cost, courts of review should be mindful of the many problems inherent in an undertaking of this nature and uphold a reasonable effort made by the Agency. [Id. at 1735.]

We submit that in its economic impact assessment the Agency has indeed made a reasonable effort to consider costs. At the outset of its criticisms of costs, C&H complains that "EPA has not fully disclosed the sources of its cost data or the basis of its assumptions...." (C&H at 59.) The plain fact is that detailed information on these matters is provided in the record (R. 199-311, 1677-2096, and 2214-2236).

While complaining that Supplement A to the cane sugar refining development document has not incorporated various changes and corrections, C&H notes that some of the estimates have been altered with handwritten notes (C&H at 59 and 60). The handwritten notes are the corrections.[48/]

48/ This is confirmed by the fact that the summarized cost data appearing in Section VII of the development document (R. 3222-3252) were made to conform with the handwritten corrections found in Supplement A to the development document. R. 199-311.

Petitioners also criticize EPA's use of 1971 dollars in its economic analysis, and argue that CPC International v. Train, supra, (CPC I), held this to be a fatal defect in remanding the corn wet milling regulations (C&H at 60; Amstar at 18). In fact all that CPC I held was that the Agency should use the most current cost figures available. This was done by the Agency in the present case.

The supporting economic materials for the sugar regulations are contained in "Economic Analysis of Proposed Effluent Limitation Guidelines - Cane Sugar Refining Industry" (R. 2484-2592). The work for this study began in January, 1973, and the report was issued in October of that year. The document used 1972 economic information (R. 2512, 2515, 2517, and 2519), that being the last full year for which economic data were available. Moreover, what is important is not so much the costs themselves, but economic impact on the industry, which was carefully considered by EPA and which has not been changed by intervening inflationary increase. See American Petroleum Institute II, supra, slip op. at 42.

C&H's reference to 1971 cost data is probably with respect to estimated treatment costs presented in the cane sugar refining development document. These data were originally calculated in May 1973 dollars (R. 1717). They were adjusted back to August 1971 dollars by use of a standard cost index to permit cost comparisons with other industrial subcategories, also expressed in August 1971 dollars (see R. 3221 and 3521).

Further criticizing EPA's economic analysis, C&H cites a report prepared by industry consultants, Robert R. Nathan Associates, Inc., for the proposition that "many of EPA's underlying assumptions were incorrect, including understatements of the cost of capital and land and plant salvage values, and overstatements of income, total investment, and cash flow." (C&H at 61.) These criticisms were answered by EPA in the following comment response:

> "The Agency has reviewed these assumptions used in the economic impact analysis and found them to be substantially correct. The cost of capital used in the analysis is based upon the rate of return experienced in this particular industry, rather than the rate of return for the entire food processing industry. Any difference in land and plant salvage values were determined to be insignificant for the economic impact analysis." [R. 3103.]

In another criticism, C&H notes that the Nathan report's estimate of the total costs of implementing BPT and BAT is triple that of the EPA estimate. However, the Agency regarded the Nathan report's estimates as overstated. Thus responding to a comment that treatment costs were underestimated, EPA stated: "The Agency has reexamined the cost data and finds that these data are accurate and substantiate the reasonableness of the proposed regulations." (R. 3102.)

C&H sharply criticizes EPA for using a land acquisition cost for treatment facilities of $1000 and $1720 per acre (C&H at 62). According to C&H, land costs will be far greater in urban areas (C&H at 63). Initially, it should be noted that twelve to fourteen urban refineries do not have to construct treatment facilities to achieve BPT

because they discharge into municipal systems. The remaining refineries will not necessarily have to purchase additional land to construct treatment facilities. For instance, C&H does not allege that it has had to purchase land in connection with the biological treatment plant it now has under construction. Nor does EPA have any information indicating that either Godchaux-Henderson or Amstar have had to purchase additional land for the treatment facilities they now have under construction.

C&H alleges that EPA underestimated the baseline waste loadings for its model refineries by assuming the pre-existence of filter aid recycle systems (C&H at 63). According to C&H, this resulted in EPA omitting an approximate $500,000 capital cost necessary to recycle filter aid. C&H supports its allegations with a reference to a USCSRA comment stating that EPA must have included filter aid recycle as part of its model refineries (R. 2790 and 2810). USCSRA apparently assumed filter aid recycle on the basis of a number presented in the proposed cane sugar refining development document (R. 2675, Figure 18) as representing the quantity of solids included in the filter cake slurry stream (see R. 2790 and 2810). This number was underestimated due to a calculation error (see answer to comment 13, R. 3102). However, the correct number was presented in the final development document (R. 3217, Figure 18) and was used in the background materials on which the cost estimates were made (R. 1752 and 1876). The corrected number shows that EPA did not assume the pre-existence of a filter aid system in its model refineries. Thus, contrary to C&H's contentions, a $500,000 cost was not omitted from the EPA cost estimate.

Another C&H complaint is that EPA underestimated costs by assessing in-plant labor costs at $4/hour "whereas refinery craft labor actually varied in 1974 from $8-10/hour, and outside contractors in metropolitan areas were charging $15 or more per hour." (C&H at 63.) EPA did in fact assess contract labor at $12.25 per hour (R. 1728). This $12.25 per hour estimate made on the basis of 1971 dollars is equivalent to $15.20 in 1974 dollars. (See Engineering News Record, March 18, 1976, at 63, construction cost index, which includes an assessment of common labor costs.)

C&H states that the USCSRA price quotations for equipment needed to improve entrainment reduction are 470 and 780 percent higher than the figures used by EPA (C&H at 63 and 64). The EPA prices are based on quotations given by manufacturers of this type of equipment (R. 1734, 1738, 1855, and 1859). Moreover, C&H does not even contend that it will actually have to purchase such equipment to meet the BPT limitations. Rather earlier in its brief C&H conceded that "minimization of sucrose entrainment in barometric condenser cooling water by use of improved baffling systems and demisters" is one of the "minor control practices" that is "already in use in many refineries, and their addition does not involve substantial alterations." (C&H at 25, n. 7.)[49/]

C&H challenges the EPA cost estimate of $662,000 (1971 dollars) for biological treatment at its model 2100 tons of melt per day (tmpd) refinery on the basis of bids and engineering studies it has received

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49/ One of the four practices named by EPA as best practicable control technology currently available is as follows: "Minimization of sucrose entrainment in barometric condenser cooling water by the use of improved baffling system, demisters, and/or other control devices." R. 3260.

indicating a total cost for its 4000 tmpd refinery of $5,500,000 (C&H at 64). The EPA cost estimate was fully supported by cost information available to EPA at the time of promulgation and is further supported by cost information that has become available to EPA after promulgation. On the other hand, the C&H estimate, presented in this brief long after promulgation, is deficient for numerous reasons, as shown in the following discussion.

In the proposed cane sugar refining development document, EPA estimates the incremental cost of installing a biological treatment system at its model 2100 tmpd refinery to be $662,000 (August 1971) and its model 600 tmpd refinery to be $255,000 (August 1971) (R. 3224). 50/ Because industry complained in comments that these costs were understated, EPA reexamined them before issuing the final regulations.

This was accomplished by comparing the cane sugar refinery cost estimates with cost estimates available for other industrial subcategories and with actual cost data for existing treatment plants. Thus it was noted that the dairy processing development document presents

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50/ According to figures used in defining the model refineries, the large 2100 tmpd refinery would use 735,000 gallons per day (gpd) of process water and the small 600 tmpd refinery would use 210,000 gpd of process water. See R. 3217 and 3220. For both refineries, process water effluent was assumed to contain 560 mg/l of BOD5.

The cost estimates for the small and large refineries are based on detailed engineering estimates summarized in Supplement A to the cane sugar refining development document at R. 223-226.

an $850,000 (August 1971) cost estimate for an activated sludge treatment system at a plant using 735,000 gpd of process water and with a BOD_5 concentration of 560 mg/l (R. 3521). The dairy estimates include the cost of a chlorination feed system and a chlorination contact basin, which are not necessary in treating cane sugar refinery wastes. The estimate also includes costs associated with the installation of laboratory, garage, and shop facilities (R. 3521), which were considered to be already in existence at cane sugar refineries.

Also, EPA had available for comparison an actual $550,000 cost for an activated sludge system operating at a citrus processing plant. That plant used 2,000,000 gpd of process water and had an influent BOD_5 concentration of 2,000 mg/l. ("Complete Mix Activated Sludge Treatment of Citrus Process Wastes," U.S. EPA, Water Pollution Control Research Series 12060 EZY, August 1971, at 6770. This report is referenced in the record of the instant case at R. 3270.)

It is interesting to note that comments made by USCSRA during the Agency proceeding are actually more in line with the EPA estimate than the exorbitant estimate presented by C&H in its brief. In their comments of January 7, 1974, USCSRA estimated $1,030,000 as the incremental investment cost for a 2100 tmpd refinery which they assumed would use 850,000 gpd of process water (R. 2890). But in previous comments of August 6, 1973, USCSRA estimated the incremental investment cost for this sized refinery would be $850,000 (R. 2324). This estimate was based on a 1973 study of a Southern refinery which included a capital cost of $1 per gpd of process water treated (R. 2331). If the USCSRA

process water usage is adjusted to that of the EPA model of 735,000 gpd, the cost becomes $735,000. The EPA estimate of $662,000 reconverted to May 1973 dollars, is $770,000 (R. 1927)--actually more than the adjusted industry estimate.

Data which have become available to the EPA subsequent to promulgation confirm the accuracy of the Agency's cost estimates for biological treatment applied to the cane sugar refining industry. See American Petroleum Institute II, supra at 31; American Iron and Steel Institute v. EPA, supra, at 1055, n. 61; and Amoco Oil Co. v. EPA, supra, at 729, n. 10, all discussed supra in Section III(D). Data provided to the Louisiana Stream Control Commission indicate that Godchaux-Henderson of Reserve, Louisiana, is constructing a biological treatment system at its 1700 tons (1540 kkg) of melt per day (tmpd) crystalline cane sugar refinery to comply with BPT regulations at an estimated cost of $487,637 (Appendix B, Exhibit 3). Also, it has been determined that the Mitsui Sugar Company of Japan is employing the activated sludge process to successfully treat cane sugar refinery waste waters at a cost of 93,000,000 yen in 1973. This is equivalent to approximately $331,000 American dollars at the 1973 exchange rate. This plant is designed to treat 260,000 gpd of refinery waste water. Its cost is almost equivalent to the EPA $296,000 (May 1973) cost estimate for the small crystalline (210,000 gpd) model plant (R. 1717).

Now we turn to the cost estimates presented by C&H in its brief. First, C&H alleges that it has received bids and engineering studies that indicate a total cost of $6,000,000 for the installation of

a biological treatment system (C&H at 64, n. 26). This treatment system will treat community wastes of a local sanitary district in addition to refinery wastes. C&H estimates that the total costs of treating the refinery wastes alone will be $5,500,000. Initially, we note that this is down two million dollars from the $7.5 million dollar estimate C&H presented to this Court in a brief of September 3, 1975, to obtain a stay of the regulation as to it alone.[51/]

Also, it should be noted that a direct comparison of the EPA and C&H estimates is not possible since the C&H estimate is for its 4,000 tmpd system and the EPA estimate is for a 2,100 tmpd model system. Additionally, the two estimates apparently do not use the same year dollars. EPA's estimate, appearing in the record, is presented in 1971 dollars (R. 3221). C&H's estimate, which does not appear in the record, fails to specify what year dollars were used.

Furthermore, C&H does not provide sufficient details regarding its post hoc cost estimate for us to determine whether a comparison to the EPA estimate is appropriate.[52/] Of particular concern is C&H's

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51/ Although C&H nominally sought the stay to avoid making irrevocable financial commitments for the construction of a biological treatment system, it is now constructing such a system as demonstrated by the following statement in Dr. Mead's affidavit to the C&H brief at page 2. "[C]onstruction bids and equipment quotations were received and contracts awarded and purchase orders placed. . . ."

52/ It should be noted that EPA did not have the benefit of the C&H total cost estimate, much less the details, at the time of promulgation. As we explain in our discussion of the Amstar issues in Section II of this brief, it is inappropriate for the Court to consider data which has not been initially presented to the Agency.

accounting attribution of $500,000 of the total six million dollar cost to the treatment of the local district's sanitary wastes. We simply are not provided with adequate information to enable us to make an independent evaluation of how the costs should be distributed for accounting purposes. For instance, to make such an evaluation we would need to know the total flow rate to the system and the volume of the community sanitary wastes.

Also, it is possible that the C&H $5.5 million dollar estimate includes numerous costs that EPA would not consider properly attributable to treating refinery wastes alone to meet the BPT limitations. For example, the following items could be included: costs of refinery improvements not associated with pollution abatement, costs of treating C&H's sanitary wastes, and costs of treating all wastes to meet municipal standards, which are more stringent than the BPT limitations.

Additionally, C&H's system, as opposed to EPA's model, may be based on making large capital investments that will substantially reduce operating expenditures (e.g. installation of power generation facilities rather than purchasing power from a local utility). These examples demonstrate that the details simply have not been made available on the C&H estimate to determine whether it can appropriately be compared to the EPA estimate.

With respect to BAT cost estimates, C&H contends that EPA did not provide a fully itemized breakdown to permit detailed analysis and rebuttal (C&H at 65). However, detailed cost breakdowns are included in the record materials and are summarized in Supplement A to the cane

sugar development document (R. 228). [53] Moreover, the Courts have allowed EPA considerable latitude with respect to BAT costs. The discussion of this subject by the Court of Appeals for the District of Columbia Circuit in American Frozen Food Institute v. Train, 8 E.R.C. 1993 at 1998-1999 (C.A.D.C., 1976), taken directly from the Legislative History, is pertinent:

> "As to the cost of 'best available' technology, the Conferees agreed upon the language of the Senate bill in Section 304(b)(2). While cost should be a factor in the Administrator's judgment, no balancing test will be required. The Administrator will be bound by a test of reasonableness. In this case, the reasonableness of what is 'economically achievable' should reflect an evaluation of what needs to be done to move toward the elimination of the discharge of pollutants and what is achievable through the application of available technology - without regard to cost. [Emphasis added by the Court.]

See also American Iron and Steel Institute v. EPA, supra, 526 F.2d at 1051-1053, 1062. This Court also noted in Hooker Chemicals v. Train, supra, the latitude which the Administrator must have in his consideration of costs, stating:

> "It would be unfair to expect the EPA to pinpoint exactly all conceivable cost ramifications of the 1983 limitations. To precisely identify the costs many years into the future is an almost impossible task." [8 E.R.C. at 1972.]

53/ Among the numerous cost estimates provided were $400,000 for the cooling tower and its associated equipment; $259,000 for the additions to the biological treatment system to handle the cooling tower blowdown; and $54,000 for sand filters. R. 228.

Alleging that EPA cost estimates for the incremental cost of a cooling tower is $714,000, [54/] C&H contends that a "USCSRA submission indicated a more realistic installation cost for such a tower would be between $1 and 2 million." (C&H at 65.) C&H also makes note of a USCSRA study that estimates a total installation cost, excluding land, of $1.9 million (C&H at 65).

The USCSRA $1 to $2 million cost estimate is based on costs of equipment at various sized plants scaled up to a 32 mgd plant (R. 2882). This results in a tremendous overstatement of costs due to the fact that the actual bccw usage figure used for the model plant is 17 mgd. [55/]

If the USCSRA mistaken size projection is taken into account, its cost estimates for the cooling tower alone actually support the EPA estimate. For instance the USCSRA $1.9 million estimate is for a refinery using 30 mgd of bccw and includes costs other than for the cooling tower alone. [56/] The cost for the tower alone is $505,000 (R. 2884). This is consistent with the EPA estimate of $330,000 for the cost of a 17 mgd cooling tower alone (R. 1865-1866).

54/ Actually, EPA's estimate of the incremental cost of the cooling tower and auxiliary equipment is $400,000. R. 228. The EPA estimate for the cooling tower, without inclusion of the auxiliary equipment (essentially piping) is $330,000. R. 1865-1866.

55/ This is derived by miltiplying 8150 gallons of bccw per ton of melt, R. 3217, by 2100 tons of melt per day, R. 3220, to obtain 17,100,000 gallons per day.

56/ More than one million dollars is included for pumping and piping. USCSRA does not provide the background material on which this figure was based. Nor does it state that the system on which its estimate is based, represents the most economic alternative.

Another USCSRA estimate for an 11.5 mgd cooling tower alone is $166,000 (1965) (R. 2882). Adjusting this figure to reflect 1971 dollars yields approximately $278,000. Again this is consistent with the EPA estimate of $330,000 for the larger 17 mgd cooling tower alone.

Furthermore, it should be noted that EPA took into account the potential increased costs of installing a cooling tower and its auxiliary equipment in urban locations. This was accomplished by adjusting the $400,000 estimate for cooling towers in general to $709,000 for urban refineries (see R. 2570). This estimate is supported by the USCSRA comment that the actual installed cost of a 14 mgd cooling tower and its auxiliary equipment at an Eastern urban refinery was $519,000 (1972) (R. 2884).

Also with respect to BAT costs, C&H notes that rapid sand filters have relatively high operating costs (C&H at 38). However, these costs, which are indeed higher than those for slow sand filtration (see R. 3205), have been taken into account in the EPA cost estimates. (R. 3226, 3227; see also R. 221, 227-235, and 2214-2236.)

Thus, from the foregoing it can be seen that EPA carefully evaluated the costs associated with the implementation of the designated technologies.

CONCLUSION

For the foregoing reasons, the effluent limitations guidelines for the crystalline cane sugar refining industry should be upheld by this Court.

Respectfully submitted,

PETER R. TAFT,
Assistant Attorney General

ALFRED T. GHIORZI,
WILLIAM L. WANT,
Attorneys, Department of Justice,
Washington, D.C. 20530

G. WILLIAM FRICK
General Counsel.

RIDGWAY M. HALL, JR.
Associate General Counsel,
Environmental Protection Agency
Washington, D.C. 20460.

OCTOBER 1976

90-5-1-7-72

33 U.S.

APPENDIX A

The pertinent provisions of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. secs. 1251 et seq., are as follows:

"EFFLUENT LIMITATIONS

33 U.S.C. §1311 "SEC. 301. (a) Except as in compliance with this section and sections 302, 306, 307, 318, 402, and 404 of this Act, the discharge of any pollutant by any person shall be unlawful.

"(b) In order to carry out the objective of this Act there shall be achieved—

"(1)(A) not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, (i) which shall require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of this Act, or (ii) in the case of a discharge into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, which shall require compliance with any applicable pretreatment requirements and any requirements under section 307 of this Act; and

"(B) for publicly owned treatment works in existence on July 1, 1977, or approved pursuant to section 203 of this Act prior to June 30, 1974 (for which construction must be completed within four years of approval), effluent limitations based upon secondary treatment as defined by the Administrator pursuant to section 304(d)(1) of this Act; or,

"(C) not later than July 1, 1977, any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations (under authority preserved by section 510) or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to this Act.

Post, p. 893

"(2)(A) not later than July 1, 1983, effluent limitations for categories and classes of point sources, other than publicly owned treatment works, which (i) shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act, which such effluent limitations shall require the elimination of discharges of all pollutants if the Administrator finds, on the basis of information available to him (including information developed pursuant to section 315), that such elimination is technologically and economically achievable for a category or class of point sources as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act, or (ii) in the case of the introduction of a pollutant into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, shall require compliance with any applicable pretreatment requirements and any other requirement under section 307 of this Act; and

"(B) not later than July 1, 1983, compliance by all publicly owned treatment works with the requirements set forth in section 201(g)(2)(A) of this Act.

"(c) The Administrator may modify the requirements of subsection (b)(2)(A) of this section with respect to any point source for which a permit application is filed after July 1, 1977, upon a showing by the owner or operator of such point source satisfactory to the Administrator that such modified requirements (1) will represent the maximum use of technology within the economic capability of the owner or operator; and (2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

"(d) Any effluent limitation required by paragraph (2) of subsection (b) of this section shall be reviewed at least every five years and, if appropriate, revised pursuant to the procedure established under such paragraph.

"(e) Effluent limitations established pursuant to this section or section 302 of this Act shall be applied to all point sources of discharge of pollutants in accordance with the provisions of this Act.

"(f) Notwithstanding any other provisions of this Act it shall be unlawful to discharge any radiological, chemical, or biological warfare agent or high-level radioactive waste into the navigable waters.

33 U.S.C. § 1314

"INFORMATION AND GUIDELINES

Water quality criteria publication.

"SEC. 304. (a)(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after the date of enactment of this title (and from time to time thereafter revise) criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on biological community diversity, productivity, and stability, including information on the factors affecting rates of eutrophication and rates of organic and inorganic sedimentation for varying types of receiving waters.

"(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after the date of enactment of this title (and from time to time thereafter revise) information (A) on the factors necessary to restore and maintain the chemical, physical, and biological integrity of all navigable waters, ground waters, waters of the contiguous zone, and the oceans; (B) on the factors necessary for the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters and to allow recreational activities in and on the water; and (C) on the measurement and classification of water quality; and (D) for the purpose of section 303, on and the

identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives.

"(3) Such criteria and information and revisions thereof shall be issued to the States and shall be published in the Federal Register and otherwise made available to the public. Publication in Federal Register.

"(b) For the purpose of adopting or revising effluent limitations under this Act the Administrator shall, after consultation with appropriate Federal and State agencies and other interested persons, publish within one year of enactment of this title, regulations, providing guidelines for effluent limitations, and, at least annually thereafter, revise, if appropriate, such regulations. Such regulations shall— Effluent limitation guidelines, publication.

"(1)(A) identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best practicable control technology currently available for classes and categories of point sources (other than publicly owned treatment works); and

"(B) specify factors to be taken into account in determining the control measures and practices to be applicable to point sources (other than publicly owned treatment works) within such categories or classes. Factors relating to the assessment of best practicable control technology currently available to comply with subsection (b)(1) of section 301 of this Act shall include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, and shall also take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate;

"(2)(A) identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment techniques, process and procedure innovations, operating methods, and other alternatives for classes and categories of point sources (other than publicly owned treatment works); and

"(B) specify factors to be taken into account in determining the best measures and practices available to comply with subsection (b)(2) of section 301 of this Act to be applicable to any point source (other than publicly owned treatment works) within such categories or classes. Factors relating to the assessment of best available technology shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate; and

"(3) identify control measures and practices available to eliminate the discharge of pollutants from categories and classes of point sources, taking into account the cost of achieving such elimination of the discharge of pollutants.

"(c) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall issue to the States and appropriate water pollution control agencies within 270 days after enactment of this title (and from time to time thereafter) information on the processes, procedures, or operating methods which Pollution discharges, elimination procedures information.

result in the elimination or reduction of the discharge of pollutants to implement standards of performance under section 306 of this Act. Such information shall include technical and other data, including costs, as are available on alternative methods of elimination or reduction of the discharge of pollutants. Such information, and revisions thereof, shall be published in the Federal Register and otherwise shall be made available to the public.

Alternative waste treatment methods.
Publication in Federal Register.

Secondary treatment information.

"(d)(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall publish within sixty days after enactment of this title (and from time to time thereafter) information, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, on the degree of effluent reduction attainable through the application of secondary treatment.

"(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall publish within nine months after the date of enactment of this title (and from time to time thereafter) information on alternative waste treatment management techniques and systems available to implement section 201 of this Act.

"(e) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall issue to appropriate Federal agencies, the States, water pollution control agencies, and agencies designated under section 208 of this Act, within one year after the effective date of this subsection (and from time to time thereafter) information including (1) guidelines for identifying and evaluating the nature and extent of nonpoint sources of pollutants, and (2) processes, procedures, and methods to control pollution resulting from—

"(A) agricultural and silvicultural activities, including runoff from fields and crop and forest lands;

"(B) mining activities, including runoff and siltation from new, currently operating, and abandoned surface and underground mines;

"(C) all construction activity, including runoff from the facilities resulting from such construction;

"(D) the disposal of pollutants in wells or in subsurface excavations;

"(E) salt water intrusion resulting from reductions of fresh water flow from any cause, including extraction of ground water, irrigation, obstruction, and diversion; and

"(F) changes in the movement, flow, or circulation of any navigable waters or ground waters, including changes caused by the construction of dams, levees, channels, causeways, or flow diversion facilities.

Publication in Federal Register.

Such information and revisions thereof shall be published in the Federal Register and otherwise made available to the public.

Pretreatment standards guidelines, publication.

"(f)(1) For the purpose of assisting States in carrying out programs under section 402 of this Act, the Administrator shall publish, within one hundred and twenty days after the date of enactment of this title, and review at least annually thereafter and, if appropriate, revise guidelines for pretreatment of pollutants which he determines are not susceptible to treatment by publicly owned treatment works. Guidelines under this subsection shall be established to control and prevent the discharge into the navigable waters, the contiguous zone, or the ocean (either directly or through publicly owned treatment works) of any pollutant which interferes with, passes through, or otherwise is incompatible with such works.

"(2) When publishing guidelines under this subsection, the Administrator shall designate the category or categories of treatment works to which the guidelines shall apply.

Test procedures, guidelines.

"(g) The Administrator shall, within one hundred and eighty days from the date of enactment of this title, promulgate guidelines establishing test procedures for the analysis of pollutants that shall include the factors which must be provided in any certification pursuant to section 401 of this Act or permit application pursuant to section 402 of this Act.

Monitoring, reporting, etc., guidelines.

"(h) The Administrator shall (1) within sixty days after the enactment of this title promulgate guidelines for the purpose of establishing uniform application forms and other minimum requirements for the acquisition of information from owners and operators of point sources of discharge subject to any State program under section 402 of this Act, and (2) within sixty days from the date of enactment of this title promulgate guidelines establishing the minimum procedural and other elements of any State program under section 402 of this Act which shall include:

"(A) monitoring requirements;

"(B) reporting requirements (including procedures to make information available to the public);

"(C) enforcement provisions; and

"(D) funding, personnel qualifications, and manpower requirements (including a requirement that no board or body which approves permit applications or portions thereof shall include, as a member, any person who receives, or has during the previous two years received, a significant portion of his income directly or indirectly from permit holders or applicants for a permit).

"(i) The Administrator shall, within 270 days after the effective date of this subsection (and from time to time thereafter), issue such information on methods, procedures, and processes as may be appropriate to restore and enhance the quality of the Nation's publicly owned fresh water lakes.

"(j)(1) The Administrator shall, within six months from the date of enactment of this title, enter into agreements with the Secretary of Agriculture, the Secretary of the Army, and the Secretary of the Interior to provide for the maximum utilization of the appropriate programs authorized under other Federal law to be carried out by such Secretaries for the purpose of achieving and maintaining water quality through appropriate implementation of plans approved under section 208 of this Act.

Transfer of funds.

"(2) The Administrator, pursuant to any agreement under paragraph (1) of this subsection is authorized to transfer to the Secretary of Agriculture, the Secretary of the Army, or the Secretary of the Interior any funds appropriated under paragraph (3) of this subsection to supplement any funds otherwise appropriated to carry out appropriate programs authorized to be carried out by such Secretaries.

Appropriation.

"(3) There is authorized to be appropriated to carry out the provisions of this subsection, $100,000,000 per fiscal year for the fiscal year ending June 30, 1973, and the fiscal year ending June 30, 1974.

APPENDIX B

UNITED STATES COURT OF APPEALS

FOR THE SECOND CIRCUIT

AMSTAR CORPORATION SUCREST CORPORATION CALIFORNIA AND HAWAIIAN SUGAR COMPANY Petitioners, v. ENVIRONMENTAL PROTECTION AGENCY, Respondent.	Docket Nos. 74-1530 74-1841 74-7246

AFFIDAVIT OF ROBERT DELLINGER

CITY OF WASHINGTON

DISTRICT OF COLUMBIA

OCTOBER 13, 1976

ROBERT DELLINGER, having been duly sworn, deposes and says:

1. I am employed by the Environmental Protection Agency (EPA), the respondent in the above action, at its office in Washington, DC, and have, since November 1972, been so employed in the Technical Analysis and Information Branch of the Effluent Guidelines Division in the Office of Water Planning and Standards. I hold a Bachelor of Science Degree, with a major in chemical engineering, from Virginia Polytechnic Institute; and the degree of Master of Chemical Engineering from the University of Maryland.

2. I am the project officer at EPA assigned to the development of effluent limitations guidelines and standards for the liquid and crystalline cane sugar refining industry under the Federal Water Pollution Control Act, including the regulations promulgated at 39 Federal Register 10522-10528, 40 C.F.R. Part 409, subparts B and C (March 20, 1974), which are the subject of the petitions for review in this case. My duties and responsibilities have included activity in the development and formulation of the aforesaid regulations and assembling and review of the record involved in this case.

3. By virtue of the foregoing I have personal knowledge of the matters hereinafter set forth.

4. The attached letters were received by EPA in connection with review of cane sugar refining regulations as required by the statute or as a result of rulemaking for the raw cane sugar processing segment.

ROBERT DELLINGER

District of Columbia, ss:

Subscribed and sworn to before me this

..... day of .....

.....
Notary Public

My Commission Expires.....

My Commission Expires April 14, 1981

EXHIBIT 1

National Institute for Water Research

of the South African Council for Scientific & Industrial Research

NATAL REGIONAL LABORATORY

Telegrams: NAVORS, Durban
Telephone: 3-51741

4013 P.O. Box 1, Congella, Natal

Our file W.14/3/1 Your file 73-001

26 March 1974

John D. Crane
Environmental Science and Engineering Inc.
P.O. Box 13454
University Station
GAINSVILLE. FLORIDA 32604
U.S.A.

Dear Mr Crane,

SUGAR MILL EFFLUENT DISPOSAL

Thank you for your letter of 7 February 1974. It has taken a little time to check on the present situation and I am sorry to inform you that data on full-scale operation of cane mill effluent treatment plant of the kind that you requested is not yet available in this country.

There are two plants in current operation, one employing an anaerobic pond followed by a Pasveer ditch-type activated sludge system and the other consists of two stone medium biological filters. Both produce effluents with a C.O.D. around 100 mg/l but regular analysis required for calculation of load rates etc., is lacking.

More full-scale plants are expected to be installed within the next few years but at the moment many mills are able to meet the official effluent standards by irrigation of mill effluent diluted with cooling water onto their adjacent cane lands without damage to the crop.

I regret that I am unable to be more helpful and hope that you will be able to obtain suitable data from other sources.

Yours sincerely,

J. Hemens, Ph.D.
for OFFICER-IN-CHARGE

01240

TO RJM
RHJ
MHS

EXHIBIT 2

CSIR

Council for Scientific and Industrial Research

National Institute for Water Research Natal Regional Laboratory

P.O. Box 17001 Congella 4013 Natal South Africa Telex 67431 Telegrams Navors, Durban - Telephone 35-1741

Our ref. W.14/3/1 Your ref. JB/WH

25 August 1975

Office of Water and Hazardous Materials
Effluent Guidelines Division
U.S. Environmental Protection Agency
WASHINGTON D.C. 20460
U.S.A.

Attention: Dr R.W. Dellinger
Project Officer

Dear Dr Dellinger,

CANE MILLING EFFLUENTS

I must apologise for the delay in replying to your enquiry of 25 May 1975 regarding the treatment of mill effluents in South Africa.

It has taken some time to determine the current position at the various mills in this country and I regret to advise you that we are not yet in a position to provide the data you require.

I have been in contact with the Director of our Sugar Milling Research Institute and his letter, a copy of which is attached, summarises the current position. The design of the plant at Dalton referred to in the letter is based on work described in our paper in the Journal of Water Pollution Control Federation to which you refer. This plant is expected to come into operation early in 1976 and fairly detailed records of performance will be obtained in collaboration with the Sugar Milling Research Institute. If this information will still be of interest to you at the end of 1976 we will be pleased to make copies of the records available.

Yours sincerely,

J Hemens.

J. Hemens
SENIOR CHIEF RESEARCH OFFICER

01241

EXHIBIT 3

Godchaux-Henderson
SUGAR CO., INC.
P. O. DRAWER AM • RESERVE, LOUISIANA 70084

RESERVE
A C 504-536-1161

NEW ORLEANS
A C 504-523-3007

September 22, 1975

State of Louisiana Stream Control Commission
Post Office Drawer FC, University Station
Baton Rouge, Louisiana 70803

Gentlemen:

SUBJECT: Godchaux-Henderson Refinery at Reserve, Louisiana

The Godchaux-Henderson Sugar Co., Inc. requests approval of the enclosed page 1 and page 2 which describe Total Effluent Limits and sample points for the period to 6-30-77 on page 1, and after 7-1-77 on page 2.

The following program is being developed as a means of achieving compliance with the 1977 regulations.

1. Collection of contaminated process waste waters and treatment thereof. This treatment will consist of a series of six settling basins. The first of which will be an equalization pond followed by four aeration basins of which No. 1 will contain four 60 HP aerators, No. 2 will contain two 50 HP aerators, No. 3 will contain one 40 HP aerator, and No. 4 will contain one 50 HP aerator and a settling basin for final removal of solids. The equalization pond will contain two 5 HP aerators for odor control. Total pond area will be 6-3/4 acres. Discharge from this treatment system will go to the Mississippi River.

2. Dry handling of filter cake and impounding in a solid waste land fill.

3. Return of the water plant sludge to the Mississippi River, via Discharge Point 003 as proposed.

4. Discharge of the barometric condenser water through the ditches to Godchaux Canal, the swamp, the Reserve and Mississippi Bayous to Lake Maurepas.

The preliminary estimates for expenditures to comply with this schedule are $487,637.

Respectfully submitted,

J. A. Metzler
Vice President - Operations

JAM/la
Enclosures

EXHIBIT 4

MITSUI SUGAR Co., LTD.

6, HONCHO 3-CHOME, NIHONBASHI, CHUO-KU, TOKYO, 103, JAPAN.

PHONE TOKYO 663-3111 CABLE "MITSUISEITO" TOKYO

SPOON SUGAR®

Mr. Mario Iacobani

Colin A. Houston & Associates Inc.
1154 Old White Plains Road,
Mamaroneck, N.Y. 10543
U. S. A. (200 Years Old)

Dear Sir,

We received your letter dated July 19, 1976. First of all, please understand that we are not English writer but Japanese style English writer. Consequently you might feel some difficulties in reading this letter and papers attached hereto. Inconvinience regretted.

Besides our ifformations, we would like to advise you to contact with two sources below:

1. Prof. (Dr.) Motoyuki Suzuki

   Institute of Industrial Science, University of Tokyo
   NO. 7-22-1 Roppongi, Minato-ku, Tokyo, Japan

   He is an adviser to a Sugar Refinery and has long been observing and analyzing pollutants from refinery process. Activated carbon is one of his major, Copies of his reports are enclosed herewith.

2. Mr. Ichiro Kurokawa (president)

   Konan Utilities Co., Ltd.
   No. 37 Fukaehamacho, Higashinada-ku, Kobe, Japan

   The company is in the center of the greatest food industry estate andsupplies electricity, steam and water treatment services for more than fifteen companies including 1000 t/d sugar refinery.

   Water treatment design conditions by activated sludge

Effluent quantity:		7600 cu.m per day
Bod:	500 ppm (in.)	20 ppm or less (out)
SS :	200 ppm (in)	50 ppm or less (out)

MITSUI SUGAR Co., LTD.
6, HONCHO 3-CHOME, NIHONBASHI, CHUO-KU, TOKYO, 103, JAPAN.
PHONE TOKYO 663-3111 CABLE "MITSUISEITO" TOKYO

SPOON SUGAR ®

Construction cost in 1973

Civil engineering	¥315,000,000
Machinery	¥288,000,000
Commissioning	¥5,500,000

We are not in the position to disclose further informations.

As for our system, pleas find our report by Mr, Kashimura enclosed herewith. Although it is written in Japanese, you might be able to read it or understand it due to English sammary and other terms in English.
The construction cost was ca. ¥93,000,000 in 1973. Running cost are shown in the Table 5.

Please do not hesitate to write to us, though we are poor English writer.

Expecting further cooperations, we are

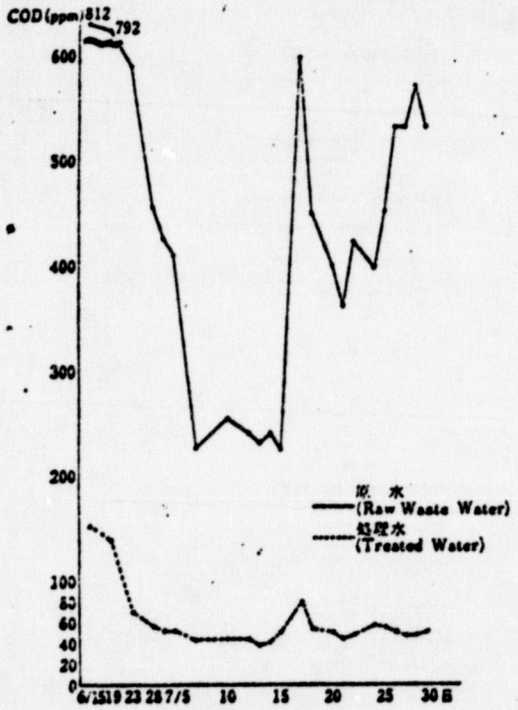
Very truly yours,

K. Nishio
Senior Engineer
Engineering Dept.

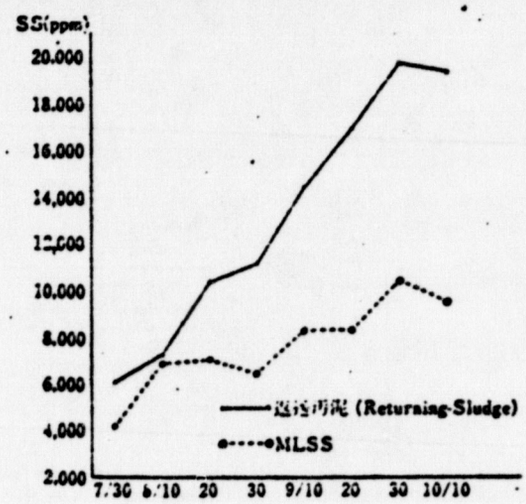
APPENDIX C

Treatment of the Waste Water by Activated Sludge Process [Excerpts]

by Kitokuro Kashimura and Yoshio Yoshida



第2図 初期運転時の原水並びに処理水のCOD
Fig. 2. COD of Water before and after Treatment at the Beginning of Operation

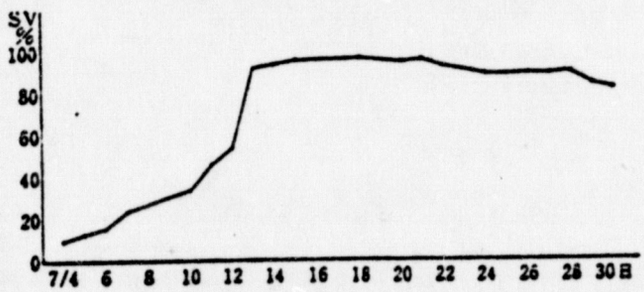


第3図 初期運転に於けるMLSSと返送汚泥の経時変化
Fig. 3. MLSS and Returning Sludge vs. Operation Period

第3図から稼働後2ヶ月でMLSSは約4,000ppmとなり，以後漸次増加し4ヶ月でほぼ現在のMLSS(8,000～10,000ppm)に達し，現在に至っている。

余剰汚泥は返送汚泥のSS15,000ppmを目安とした為，稼働後3ヶ月から発生した。

SVの経時変化については第4図に示した。



第4図 初期運転時のSVの経時変化
Fig. 4. SV vs. Operation Period

第4図から稼働後1ヶ月半頃から急にSVが大にたり，以後現在に至るまでSVは80～90%である。このSVの急増が時期的に適当と仮定するならば，微生物の対数期に相当し，不適当ならばバルキング現象と考えられる。

微生物の面から検討した結果，糸状細菌の繁殖によるバルキング現象と判定し，塩素殺菌と塩化第二鉄を曝気槽に添加し対処した。又，第2のトラブルとして脱N現象が生じたが，返送汚泥量の増大と栄養剤の供給を3日間停止することによって解決した。

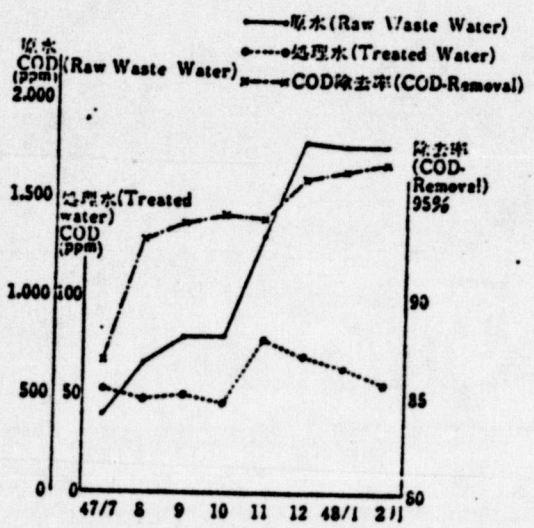
6 運転結果

第5図から原水の水温が20°C以上の時，即ち5～10月では原水COD1,000ppm以下，20°C以下の時，即ち11～4月では原水COD1,000ppm以上であることが分った。この原因は当工場の敷地内にある沈泥池（約10,000㎡）に於ける自然浄化作用に基因するものと考える。

第6図から原水水温と処理水水温はほぼ同一であることが分る。

第7図から原水の変動に対して処理水pHは殆んど変動していないことから，生物処理はpHに対してBuffer効果があることが分った。

第8図から稼働後2ヶ月でCOD除去率93%，6ヶ月後で95%以上となり，現在に至っている。



第8図 COD除去率の経時変化
Fig. 8. COD Removal vs. Operation Period

化作用の効果大。

(4) 生物処理はpHに対する Buffer 効果がある。

(5) COD除去率は稼動後半年で95%以上となり，現在に至っている。

(6) 脱水機の稼動 6 hr/day で余剰汚泥発生量は5～6 ton/dayである。

(7) ランニングコストを下げるには，コストの約55%を占めている動力費を下げるように努力する必要がある。

第4表 脱水機稼動条件
Table 4. Operation Condition of Dehydrator

脱水剤溶解濃度 Density of Dehydrate Reagents	0.2 %
脱水剤添加量 Adding Volume of Dehydrate Reagents	10 % on SS
給泥量 Feeding Volume	4～5 m³/hr
給泥濃度 Density	20～30 kg/m³ as SS
稼働時間 Operating Time	6 hrs/day

第5表 ランニングコスト
Table 5. Running Cost of Waste Treatment

項目 Cost Item	コスト 円/月 Cost yen/month
栄養剤 Nutrient Cost	64,000
脱水剤 Dehydrate Reagent Cost	127,500
動力費 Power Cost	316,000
搬出費 Carriage of Sludge	52,000
計 Total	559,500
ランニングコスト Running Cost	27 yen/m³

Summary

Our Okayama Sugar Refinery has drained off its waste water to Kojima Bay in the Inland Sea of Seto National Park, and so we have been regulated under the following severe regulation of waste water issued by the Local Authorities (Okayama Prefecture).

	daily average	max. in a day
COD	60 ppm and less	80 ppm
SS	80 ppm and less	100 ppm
pH	5.8 - 8.6	

This regulation is more severe criteria of waste water than central authorities.
1972 we adopted the activated sludge process because of the following reasons.

(1) The activated sludge process has been widely used.

(2) Our unused facilities were available for it.

(3) The process was recommended qy the Local A thority.
The facility was designed according to the following standard.

	original waste	treated waste
COD	1,500 ppm	100 ppm and less
SS	100 - 200 ppm	50 - 100 ppm
pH	6.0 - 9.5	6.0 - 8.0
capacity	1,000	

The results obtained are as follows :

(1) Micro-organisms propagated spontaneously in the facility without any inoculation and COD of the treated water was less than 100ppm in three weeks after the operation.

(2) COD removal has been more than 95% since a half year later.

(3) The dehydrator is operated under the following conditions :

(a) Density of feeding water : 20 - 30kg/m³ as SS.

(b) Feeding volume : 4-5 m³/hr

(c) Operating hour : 6 hrs/day

About 6 tons/day of the excess sludge with 85% moisture is treated.

(4) The quality of the treated water is not affected by pH fluctuation of the original water.

(5) In order to reduce running cost, we are now trying to cut down the power cost accounts for 55% of the total running cost.

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